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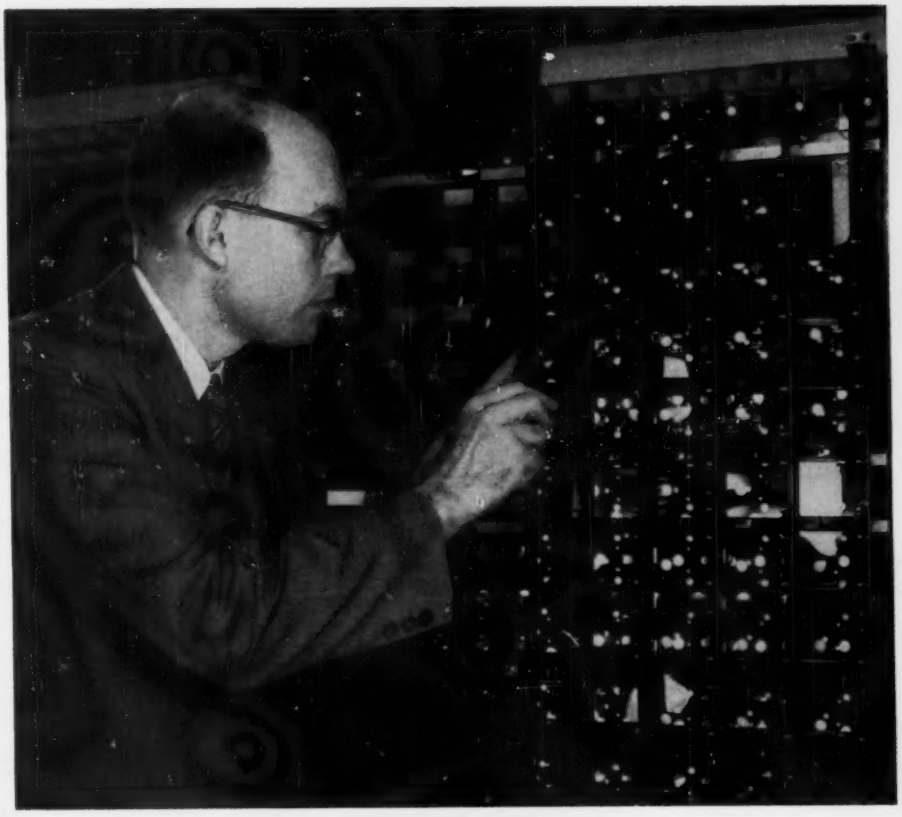
Telephony®

THE JOURNAL OF THE TELEPHONE INDUSTRY



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Guaranteed Circulation This Issue
13,388 of Which 12,830 Is Paid

SWITCHING MEMORY

M. B. Purvis of Bell Laboratories makes adjustments on optical system of the flying spot store, permanent memory for an experimental electronic telephone switching system. Story on memory device, page 48.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

"THERE IS NOTHING FINER THAN A STROMBERG-CARLSON"

Costs go down

as Stromberg-Carlson repeaters go up

On trunks and long lines, 100% transistorized "541" negative impedance repeaters assure maximum transmission quality . . . at low cost.

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In Atlanta call TRinity 5-7467; in Chicago STate 2-4235; in Kansas City HArrison 1-6618; in Rochester HUbbard 2-2200; in San Francisco OXford 7-3630.

STROMBERG-CARLSON
A DIVISION OF **GENERAL DYNAMICS**

FLASHES AND PLUGS

UNDERSTANDING, WITH A SMILE. The Associated Press recently provided this intriguing picture of telephone workmen, improvising in irrepressible American style.

A New York installer was intoning, "One, two, three, four, testing." After a little while, the tedium of repeating the words in just this way palled on him, and he "switched his line of patter." Then, began this conversation:

"Space ship one, space ship one, come in, space ship one. This is flotilla leader. I am now over Washington. Do you read me, space ship one?"

Another workman heard and answered, "I read you, flotilla leader. We are now approaching New York. First wave now in control of Sheridan Square."

By a quirk of adjoining electrical circuits, the AP reported, these messages went out over telephone lines in five downtown New York exchanges. Startled subscribers called the police.

One woman complained that she had spacemen on her telephone. Police got to the bottom of the mystery and notified the telephone company.

The company responded with this tolerant directive: "From now on, they stick to saying, 'one, two, three, four, testing.' But if they get bored with that, they can try 'four, three, two, one, testing.' "

•

GRACIAS, AMIGO. Illinois Bell reported recently, following the 1959 Pan-American Games held in Chicago, that its operators were not only the "voices with a smile," but voices with linguistic talent.

During the games, the operators were more than busy with requests from the Spanish-speaking visitors.

When a South-of-the-Border athlete's car limped to a stop, he telephoned in distress, and in Spanish, for help. To his rescue came an "Amigo" operator, who telephoned around town till she located a garage with a Spanish-speaking mechanic, and connected the two countrymen by telephone.

Result: a quick checkup . . . a peppy car . . . a happy visitor—this may justly be called service, with plenty of resourcefulness on call!

•

T. O. P. S. VIA TELEPHONE. Members of TOPS, the club that Takes Off Pounds Sensibly, believe in aiding the fight with every psychological weapon.

And this includes, when a dieter has an overpowering yearning for a double chocolate malt, a piece of pie, or some luscious chocolate creams, a telephone call to another member, who somehow, at that moment is magically fortified—against adding on pounds.

In no time at all, via the telephone, the one tempted, it is reported, has lost her craving for what puts pounds on — Thus, another facet of telephone usage.

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Department of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

January 9, 1960

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H. D. FARGO JR., *President and Director of Advertising* • A. J. STULTS, *Vice President and Advertising Manager* • R. C. RENO, *Vice President and Editor* • DAN S. FARGO, *Vice President and Managing Editor* • DIANNE P. DRUCKER, *Associate Editor* • HELEN HARDIN, *Associate Editor* • FRANCIS X. WELCH, *Washington Editor* • RAY BLAIN, *Technical Editorial Director* • MAYME WORKMAN, *Traffic Editor* • VIVIAN RYDEN, *Circulation Manager.*

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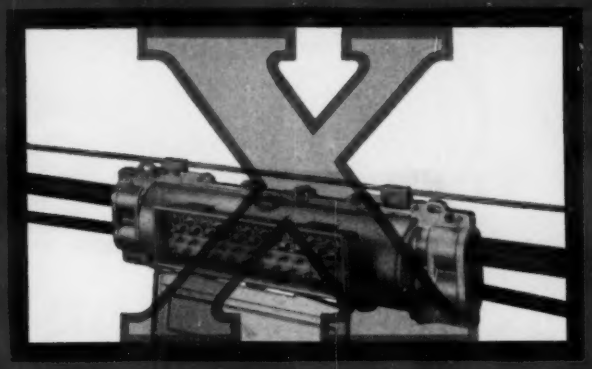

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"X" branch splice cases

No. 17 ratchet wrench

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A Symbol of Integrity Since 1909

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Lenkurt equipment lets you *add as you grow*, the "building-block" way, with the full assurance that what you install today won't be outdated tomorrow.

In addition, AE will serve as your headquarters for all telephone supplies—from cable and exchange equipment to fully integrated communication "packages."

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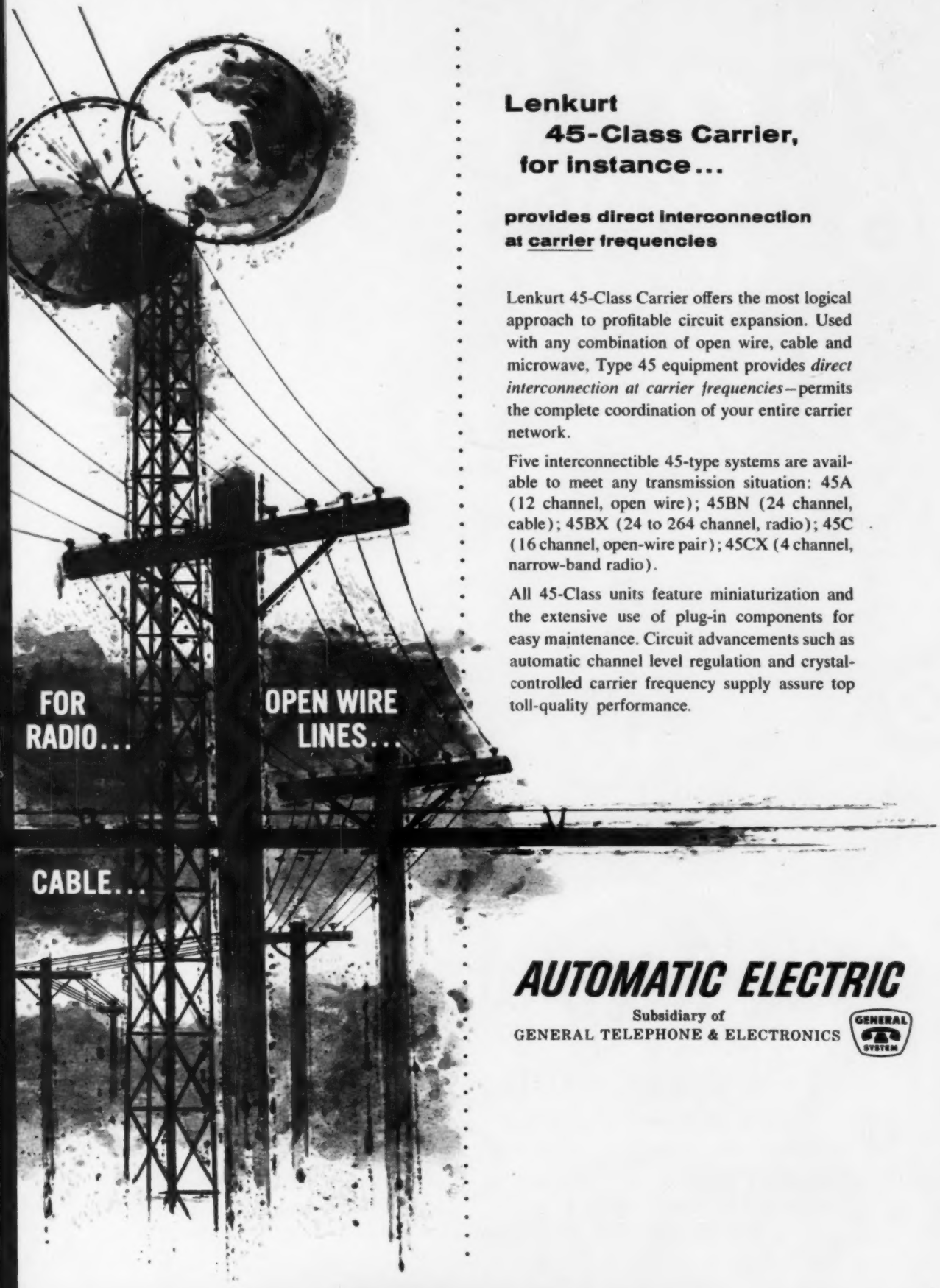

Lenkurt 45-Class Carrier, for instance...

provides direct interconnection at carrier frequencies

Lenkurt 45-Class Carrier offers the most logical approach to profitable circuit expansion. Used with any combination of open wire, cable and microwave, Type 45 equipment provides *direct interconnection at carrier frequencies*—permits the complete coordination of your entire carrier network.

Five interconnectible 45-type systems are available to meet any transmission situation: 45A (12 channel, open wire); 45BN (24 channel, cable); 45BX (24 to 264 channel, radio); 45C (16 channel, open-wire pair); 45CX (4 channel, narrow-band radio).

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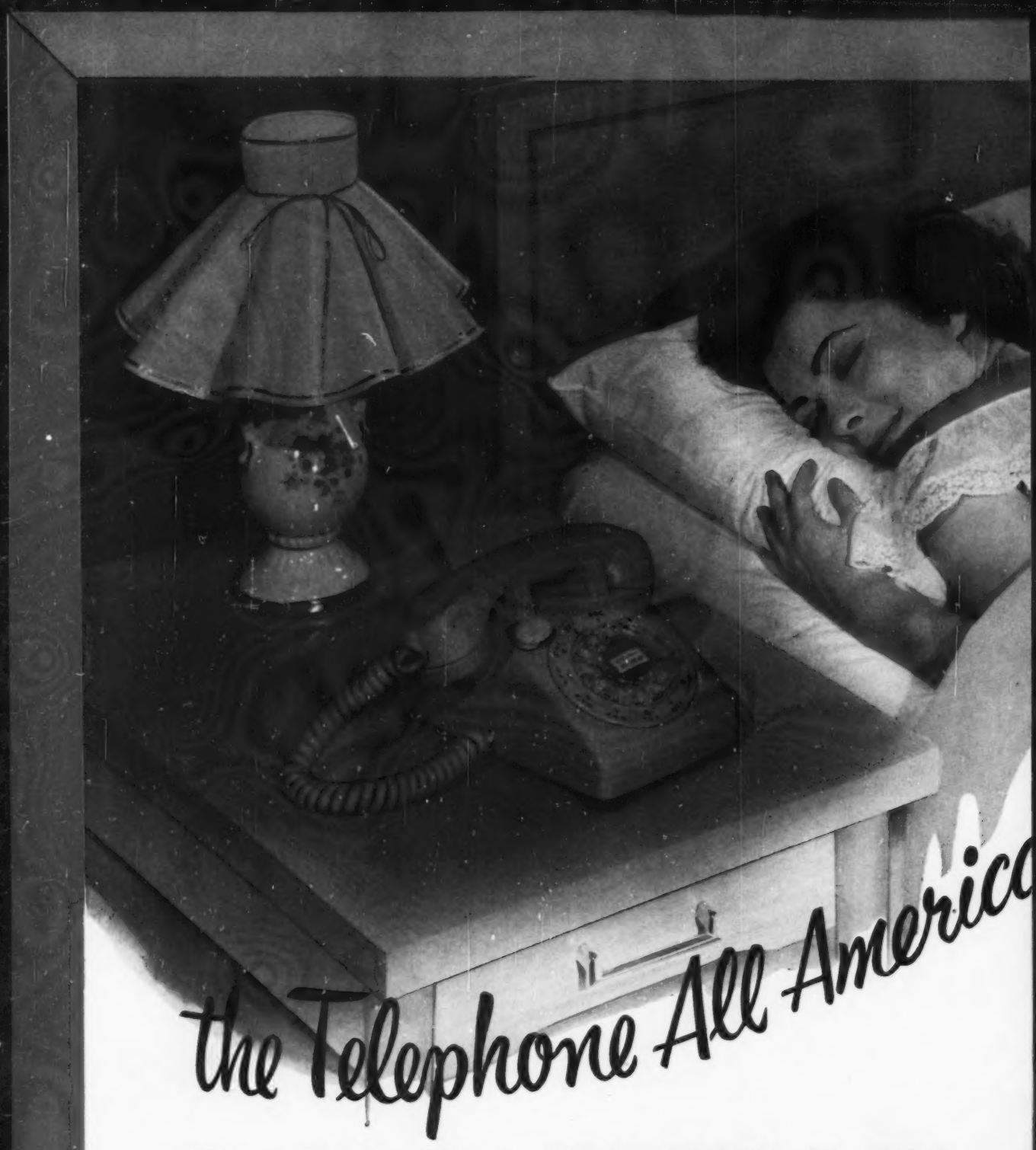

the Telephone All America

The Beautiful KELLOGG K-500

"She Sleeps better, more peacefully, with a Kellogg K-500 Extension Phone at her Bedside."

Available in 15 exciting colors . . . each distinctive, appealing, attractive . . . to match any decor . . . Striking new pastels—rose pink, white, hght beige, light gray, aqua blue . . . Plus standard favorites—yellow, green, red, blue, gray, ivory, turquoise, beige and brown . . . Colors to make life more pleasant.

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AQUA BLUE

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Communications Division of IT&T

Show Your Complete Line i

with LEICH's PABX Sales Kit

Ever have trouble showing and comparing PABX systems to a prospect? Leich's PABX Sales Kit is an excellent solution. It lets you show a prospect Leich's complete line of PABX's in a matter of minutes.

A practical, easy-to-read chart tells at a glance the capacity, type of attendant's cabinet, switchboard, and other information about each of Leich's PABX systems.

Individual brochures help you do a more complete selling job. These brochures cover Leich's popular 40A PABX, other PABX's with keyset turrets, and PABX's with floor-type cabinets.

Write for Leich's PABX Sales Kit today.

LEICH PABX DI

for faster, mo

TYPE	LINES	LINKS	CITY TRUNKS	TYPE ATTENDA CABIN
40A	40 Not expandable	5	10	See Fig. B May be used without turr
88A	88 Not expandable	9	10	See Fig. B May be used without turr
100A	100 Not expandable	15	10	See Fig. A
100C	100 per bay, expandable	15 per 100 lines	See brochure	See Fig. A
100T	100 per bay, expandable	15 per 100 lines	See brochure	See Fig. B May be used without turr

LEICH

Subsidiary of GENERAL TELEPHONE & ELECTRONICS

Minutes

How to Sell Your LEICH PABX Prospects

TELEPHONE SYSTEMS

ient business communications

SWITCHBOARD UNIT	POWER	TELEPHONE INSTRUMENTS	STANDARD SERVICE FEATURES	OPTIONAL SERVICE FEATURES
el cabinet with hinged doors front ack. 78" high, 48" wide, 15" deep; relay operation.	Ringing & talking supply contained in switchboard unit. Standby batteries, if required, are mounted externally.	Standard telephone instruments are used on all Leich PABX's. Push-buttons & special wiring not required.	2-digit local dialing, local links not tied up on city trunk calls. Consultation & transfer service. (SEE INDIVIDUAL BROCHURE)	A wide variety of optional service features is available on Leich PABX's. (See individual brochures for specific features.)
el Cabinet with sliding doors front ack. 88" high, 18" wide, 15" deep. relay operation.	Ringing supply contained in switchboard unit. 48 volt battery & charger or battery eliminator are mounted externally.		3-digit local dialing, local links not tied up on city trunk calls. Consultation & transfer service. (SEE INDIVIDUAL BROCHURE)	
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el cabinet with sliding doors front ack. 88" high, 18" wide, 15" deep. wer Bay 87" high, 88" wide. Trunk 87" high, 39½" wide, 15" deep. relay operation.	Ringing supply mounted on Power Bay. 48 volt battery & charger or battery eliminator are mounted externally.		3-digit local dialing. (SEE INDIVIDUAL BROCHURE)	
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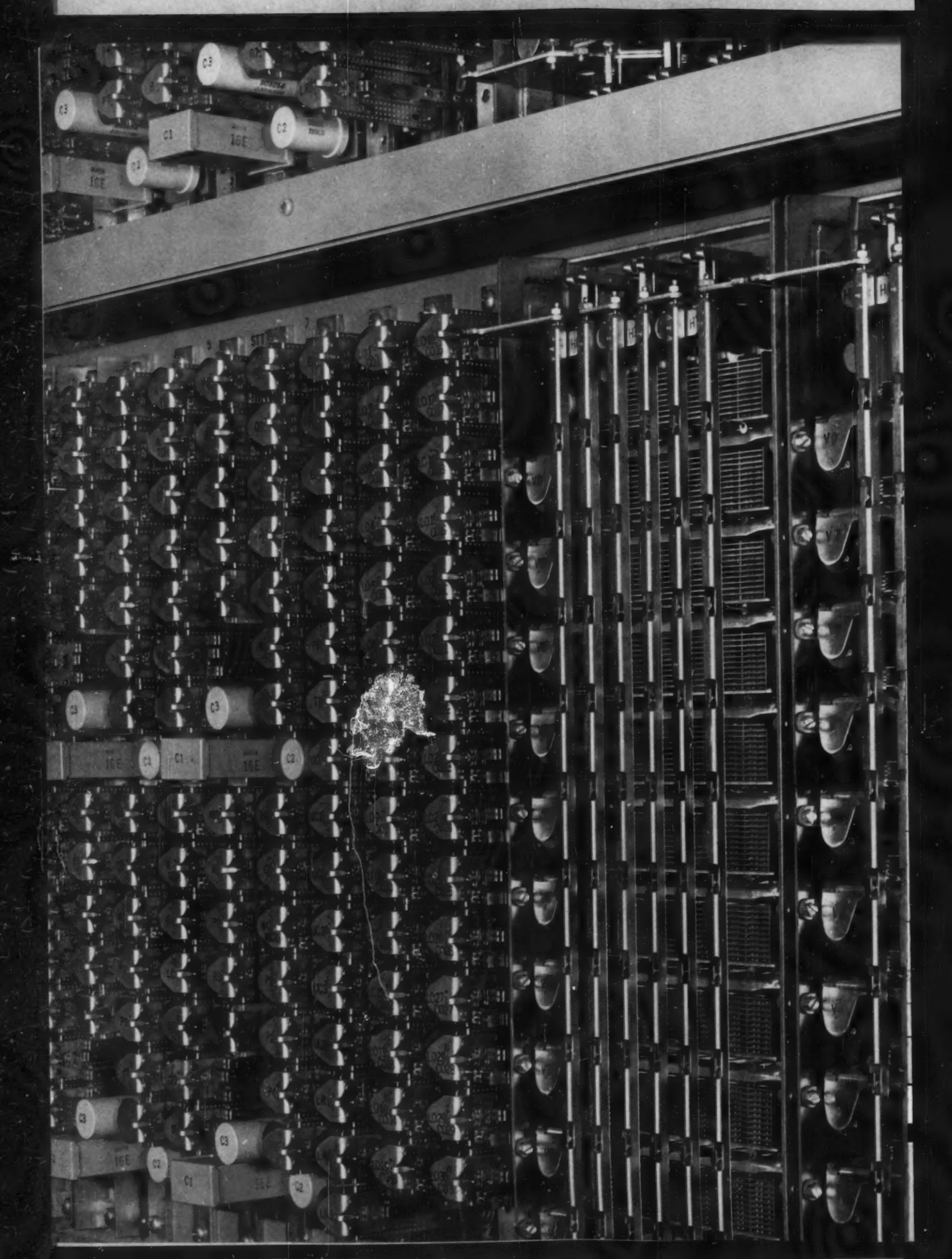
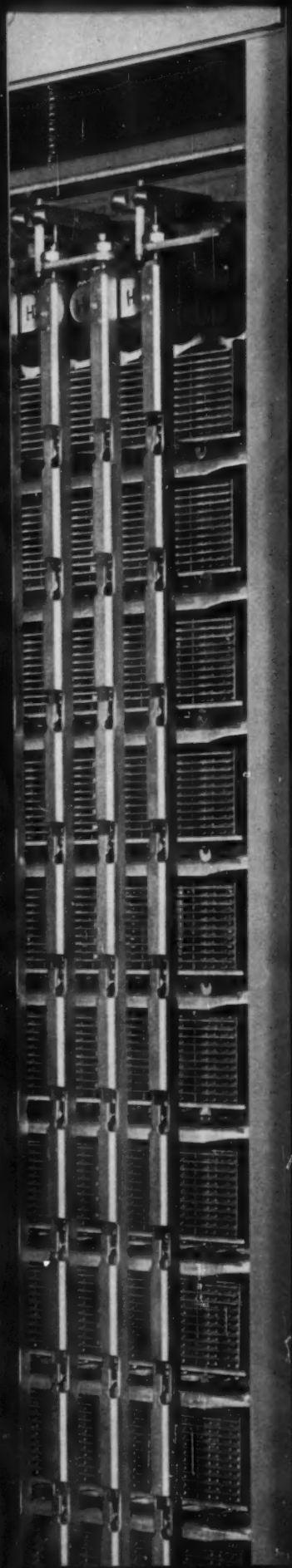
SOUTHEAST: 5126 SOUTH LOIS ST., TAMPA 11, FLORIDA

manufacturers of telephones, switchboards and related apparatus since 1907





Crossbar efficiency and economy

FOR EXCHANGES AS SMALL AS THIRTY LINES!

with North NX-2 switchboards

Standardization of component modules, inherent in the application of a modular concept, has enabled North to bring to even the smallest exchanges the efficiencies and economies of crossbar switching, heretofore available only to large exchanges.

This modular concept, using a "building block" approach, makes it possible to literally "build" a switchboard, in multiples of 30 lines, to exactly meet your switching requirements. Tremendous economies in manufacturing standardized modules mean saving to you.

Most important of all—you are able to install a switchboard that incorporates the advantages and flexibilities of proved-in-use crossbar switching.

North NX-2 modular system is compact, easy to install, low in cost, designed for easy, inexpensive expansion and lowest maintenance ever. It represents the result of North engineering focused specifically on the requirements of small and medium size offices.

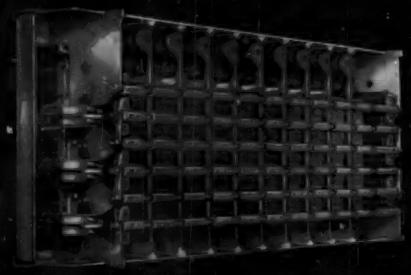
You'll want to know more about North NX-2—now.

For detailed information on North NX-2, write, wire or phone

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

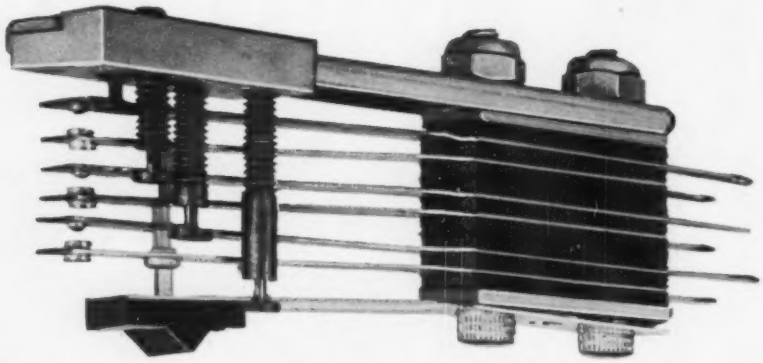
NORTH ELECTRIC COMPANY

Galion, Ohio



60-T-4

ESCO RINGING EQUIPMENT



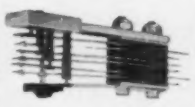
MEMBER

. . . a new twist in interrupter design assures simple, permanent pile-up adjustment

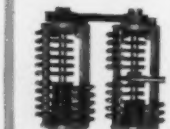
Just a simple twist of the set screws in ESCO Interrupter Pile-Ups, and you get accurate spring adjustments that stay put. You never need to use old-fashioned spring bending methods. Springs and contacts last longer because springs retain their original shape and tension, and contacts stay in alignment. This new design, too, allows up to six adjustable springs on the same pile up and that means better timing with fewer cams.

But this exclusive adjustment feature is just one of many reasons why operators and engineers who design and install equipment insist on ESCO. Compact vertical-mounting, factory pre-wiring, and permanently aligned drives on Esco Ringing Assemblies are other clinching reasons.

Why not find out for yourself why only ESCO Ringing Equipment can give the kind of service that satisfies operators and their subscribers alike. ***Write today for full information.***



Screw adjusted pile-ups



Compact, accessible interrupters

Combination alternators

Lifetime drive motors

"Ready-to-go" pre-wiring

Permanently aligned drives

ADDITIONAL ESCO FEATURES (details in future ads in this series) explain why ESCO components are included in the installations of prominent suppliers like Automatic Electric Co., Kellog Communications Division of I.T.T., Leich Sales Corp., North Electric Co., Stromberg-Carlson Co., Western Electric Co., and others.

ELECTRIC SPECIALTY CO.
176 South Street, Stamford, Connecticut

no short straws!

Each formula in the Monsanto expanding series of Opalon* Vinyl compounds is based on over ten years of experience in supplying the specialized needs of the Wire and Cable Industry. That's why you can always count on a correct answer to your specific insulation problem. Monsanto Chemical Company, Plastics Division, Springfield 2, Mass.

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*OPALON: REG. U. S. PAT. OFF.

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OPALON 1006 Primary Insulation for inside distribution cable, with good crush resistance, excellent flexibility.

Special Opalon compounds are available. Monsanto has also developed a complete line of polyethylene compounds for wire and cable insulation.

Let our "Revenue Men"

TAKE THE KINKS OUT OF YOUR KNOTTY DIRECTORY PROBLEMS!

Take a man like
Orville Spradling...

Orville is one of our Texas "Revenue Men."

A member of our Golden Directory Club for sales achievement, Orville is representative of the "Revenue Men" who help telephone companies increase their revenue from telephone directory sales.

After serving with the Army Air Force in Europe during the war, he returned to Texas Technical College. Orville then became a salesman with the Lubbock, Texas, Yellow Pages sales unit in 1947. Six years later he was promoted to supervisor of the Lubbock sales unit.

Orville lives in Lubbock with his wife and two sons. An active member in local civic and school activities, he is currently President of his church's Men's Sunday School.

Orville Spradling is another example of the "Revenue Men" who work for the General Telephone Directory Company — who work for you — who are an asset to any community in which they live.

Our Directory "Revenue Men" provide the Independent Telephone Industry with a flexible and highly skilled telephone directory organization. These men—working out of 35 strategic locations —are experienced specialists, trained to give you *complete* and *quality directory service.*

They act as telephone company representatives in their day-to-day contacts with your customers, not only selling and supervising the sale of Yellow Pages advertising—but also acting as public relations representatives for you in their dealings with the public.

Thoroughly trained to know any condition that pertains to telephone service, they're experienced hands at helping large and small Independent Telephone Companies "take the kinks out of knotty directory problems!"

Write or phone our office nearest you for our Complete Directory Service Plan.

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Let's Get the Job Done This Year

THE TELEPHONE industry has made significant strides toward its aim of telephone excise tax repeal. From the wartime high excise of 25 per cent on toll service and 15 per cent on local, reduction was secured to a level of 10 per cent on each. Then, last June 30, President Eisenhower signed into law a compromise bill which will wipe out the tax on local service on June 30, 1960. This law did not touch the tax on long distance service—that 10 per cent excise, as of now, is to remain in effect until some powerful industry push for removal does the job.

Moreover, the lifting of the tax on local service could go aglimmering if Congress decides in those hectic last days of June this year that the excise tax money is needed to balance the budget. It is entirely possible that Congress might vote to extend the local service 10 per cent bite.

Thus, a two-pronged effort by the telephone industry-at-large and its subscribers is called for now that Congress is back in session:

First, the industry must protect the gains made thus far by impressing senators and representatives with reasons for allowing the tax on local service to expire on June 30.

Second, it must build up pressure for elimination of the excise on toll service.

Having reached our present crossroads, it might be rewarding to survey how the progress to-date was achieved. As AT&T's *Long Lines* magazine editorialized in its November 1959 issue:

"Many thousands of telephone customers wrote their Congressmen and Senators urging that this unfair wartime levy be ended. Editorials in newspapers throughout the nation urged repeal of the 'emergency' taxes.

"Added to the letters from telephone customers and the editorials, were resolutions from all types of organizations—state legislatures, the U. S. Chamber of Commerce, the National Association of Railroad & Utility Commissioners, the Communications Workers of America and other labor unions, local taxpayer associations. . . .

"Legislators in Washington were aware of public sentiment. . . ."

A similar surge of public feeling must be brought to bear again if the excises are to be exorcised. The basis for such a surge of feeling lies in the reasons why the telephone excise taxes should be repealed:

(1) They are unfair and discriminatory against telephone users as a group. Telephone service is regarded as a daily necessity; however, Congress treats it as a luxury by subjecting it to the same taxes as are imposed on luxuries like club dues, night club bills, liquor and tobacco.

(2) The longer they are continued, the greater the danger that they will become a permanent part of the tax structure, a result never intended by the Congress that put them into effect.

(3) The longer the excises remain in effect, the more chance there is that some group like the Joint Federal-State Action Committee (composed of several federal officials, including the Secretary of the Treasury, plus 10 state governors) may get their proposal enacted into law; i.e., that part of the present 10 per cent excise tax on local service be transferred to the states' vocational education and waste treatment construction programs.

(4) Many subscribers are unaware that part of the cost of their telephone service is the excise tax on it. This works to the detriment of telephone companies both in regard to subscriber resistance to needed rate increases, and in the area of general competition for the consumer's dollar.

These four reasons comprise for the industry an enormous incentive to continue to work for repeal—by, among other things, again stimulating employes and subscribers to write members of Congress early in the present session. A coordinated eight-point program of what telephone companies can do to get the repeal campaign rolling again was given in TELEPHONY's Jan. 17, 1959 editorial. It helped before; let's go at it again.

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR
AND EDITOR, PUBLIC UTILITIES FORTNIGHTLY

History of mergers in U. S. by National Bureau of Economics Research writer disputes Karl Marx' theory that they occur only during depressions. FCC approves Purdue University's experiment for educational broadcasts via planes.

THERE seems to be little doubt that our national economy has been going through a period of business mergers and corporate consolidations since the end of World War II. With the Independent telephone companies feeling the pressure of rising operating costs, it is only natural that some of them are sensitive or apprehensive about what this latest series of mergers means to the Independent telephone industry as a whole.

It is generally recognized that a considerable number of Independent companies have consolidated in order to strengthen their position during this period. The reason for this is so well understood that we frequently hear, at state and national telephone association meetings, informed comment and advice about the importance of the smaller Independents strengthening their position for survival by combining with other companies of similar or larger size. For this reason, the total number of Independent operating companies has been on the decline in recent years, notwithstanding the sharp increase in the volume of business handled by Independent companies.

Commenting on this increase in business for the telephone industry as a whole, Federal Communications Commission Chairman John C. Doerfer, in his year-end statement for 1959, pointed out that the United States has 71 million telephones (of which Bell has 60.1 million and the Independents 10.8 million), or more than the total for the rest of the world. At the same time, approximately 96 per cent of Bell System companies and about 85 per cent of Independent telephone companies are dialing local calls, according to the FCC and the dial conversion program is continuing toward its point of completion.

Obviously, few of the very small companies could swing such programs as dial conversion, which has now virtually become an accepted standard of modern telephone service in the United States. The clear implication of this development is that the Independent telephone companies have been responding to a natural and normal tendency to shape their corporate organizations to a size and character which can survive under the continual stress of rising operating costs.

If the number of smaller companies, which have disappeared from the scene as separate corporate entities, had been absorbed through Bell System acquisitions there would be some reason to fear that a working balance—which has been preserved between the two segments of the industry for the past three decades—was in jeopardy. But it might be surprising to an observer unfamiliar with the characteristics of these changes in telephone company organization to learn that Bell companies have acquired very few of them—too few to be a significant factor in the over-all picture. Most of the departing smaller companies have joined with other Independents, some larger and some of comparable size.

What Causes Mergers?

The part played by mergers in the evolution of business generally has fascinated economists and legislators for more than 60 years. But, despite careful observation, as evidenced by quite a few books on the subject, we really do not know too much about why mergers occur, other than the obvious fact that they occur when the parties to the merger decide it is to their common interest to merge. Why, for example, do mergers seem to run in bunches or periods? And what effect have the cycles of business prosperity or depression had on the number of mergers? This is a subject of a book published last month by the National Bureau of Economic Research in New York. The book is called "Merger Movements in American Industry, 1895-1956," by Ralph L. Nelson of the bureau's research staff. It is a story of conclusions drawn from a study of mergers over the past 60 years. One of the conclusions drawn in Nelson's book is that Karl Marx—father of Communist ideology—was 100 per cent wrong about mergers, just as he was 100 per cent wrong about a number of other predictions he made in establishing international Communism over a century ago.

It has always been a Marxian maxim that mergers occur during hard times because big businesses take advantage of depressions to buy up their weaker competitors at bargain prices. Nelson says that just the opposite has been true, according to his bureau's statistical study. Big businesses have bought up smaller competitors in three distinct period waves, but not during hard times. Mergers, on the contrary, have occurred during periods of good times when all businesses, large and small, are making money. Furthermore, big businesses have to pay dearly for what they buy in the way of small businesses through stock and cash deals. As evidence of this, Nelson noted that during the great depression of the 1930's the march of mergers was stopped cold. There were fewer of them then than at any other time in the 20th century.

And if we think that we have quite a few mergers today, we should cast our eyes over what happened in the first big wave of mergers noted in the Nelson study. This was during the

years 1898 to 1902, a generally prosperous period following the Spanish-American War and the federal administration of McKinley and Theodore Roosevelt. So many mergers happened at that time that the federal government became alarmed and started vigorous "trust-busting activity" to prevent the decline of competition. In the public utility field, it was recognized that competition was not always the best answer to the public interest and so government regulation was substituted—first in the railroad field by the Interstate Commerce Commission, and later extended to the other fields of utility enterprises (gas, electric, telephone, and common carrier).

This first wave of mergers over the turn of the century was viewed by Nelson as probably the most important of all, because it set the pattern for our subsequent evolution of big business. It did not destroy competition in non-utility fields. On the contrary, it made the competition more vigorous by shaking down the size of the competitors to larger, more efficient units. The bigger boys can fight each other better —on more equal terms—than a few real small boys can a few big ones.

The second major wave noted by Nelson occurred during the relatively prosperous period from 1926 through 1930 when the depression struck. This differed from the first wave because it seemed to operate selectively, in a number of industrial fields, without spreading to the economy as a whole. The industrial fields mostly affected were petroleum, food processing, and chemical industries. It was also a period when hundreds of early independent manufacturers of automobiles and auto parts disappeared, leaving the Big Three (General Motors, Ford, and Chrysler) and several strong independents (Studebaker, Packard, Willys, etc.) to battle it out between themselves for the domestic automobile business.

After this second wave of mergers ceased entirely during the depression (as already noted), there were no more large-scale merger trends until after World War II when the third series, which we are still experiencing, started up. Nelson says that this third wave is really two small "wavelets" following each other with a short interval between. The first was 1946 to 1947 and the second was 1954 to 1956, but still going on.

Nelson does not suggest any hard-and-fast reasons as to why mergers occur or why they occur during periods of prosperity rather than hard times. There is a suggestion that during a period of prosperity larger businesses become geared to a pace of dynamic growth and feel pressure for absorbing additional enterprises to keep the expansion going. But this observation does not really tell us very much about causes. It is more of an explanation of a symptom.

Recent Quotations of Independent Telephone Stocks

	1/4/60 BID	1/4/60 ASKED	11/30/59 BID	11/30/59 ASKED	Current Indicated Div. Rate
Anglo-Canadian Tel. Co.	36	36¾	35½	36¼	1.20
California Interstate Tel. Co.	14	14½	14	14½	.70
California Pacific Utilities Co.	38½	39	38	38¾	1.80
California Water & Tel. Co.	27	27½	27½	27⅞	1.28
Carolina Tel. & Tel. Co.	36	37	35½	37½	1.60
Central Tel. Co.	22¾	23½	23	23¾	.88
Chenango & Unadilla Tel. Corp.	27	28	27	28	1.35
Cincinnati & Subn. Bell Tel. Co.	89	90	91	92	4.50
Citizens Utility Co. "A"	14¾	15⅛	16	16½	Stock Div.
Citizens Utility Co. "B"	12¾	13⅛	13⅛	½	.52½
Commonwealth Tel. Co.	19½	20¼	19	19¾	.90
Florida Tel. Corp. Class A	28½	29¼	29	29¾	1.00
General Tel. & Elec. Common	83	Last Sale	76⅜	Last Sale	2.20
Hawaiian Tel. Co.	20	21	20½	21½	1.00
Indiana Tel. Corp.	21½	23	21	23	
Inter-County Tel. & Tel. Co.	56	59	56	59	2.00
Inter-Mountain Tel. Co.	16	16¼	15⅝	16	.80
Lincoln Tel. & Tel. Co.	61½	Bid	60½	Bid	2.60
Middle States Tel. Co. of Ill.	24¼	25¼	23½	24¼	1.00
North Carolina Tel. Co.	1⅝	1¾	1⅝	1¾	
Northern Ohio Tel. Co.	54	56	50	53	1.60
Peoples Tel. Co.	88	Bid	90	Bid	4.00
Rochester Tel. Corp.	26¾	Last Sale	24½	Last Sale	1.00
Southern Nevada Tel. Co.	22¼	23¼	22¼	23¼	1.00
Southern New England Tel. Co.	44⅝	45	44¾	45¼	2.20
Southwestern States Tel. Co.	22¾	23¼	24	24⅜	1.20
Tel. Service Co. of Ohio Class A	132	Bid	122	—128	1.90 + Stk.
Tidewater Tel. Co.	25	27	25½	26½	1.40
United Utilities, Inc.	41	41¾	37¼	37¾	1.40
West Coast Tel. Co.	24½	24⅞	24¾	25½	1.20
Western Light & Tel. Co., Inc.	42	43	40½	41½	2.00

(Quotations supplied by Merrill Lynch, Pierce, Fenner & Smith)

Utility Mergers

In the public utility field where mergers of operating companies under regulation have been viewed as preferable to area competition, we have seen some interesting developments. Most of us remember when Congress authorized, by statute, the merger of the old Postal Telegraph Co. with Western Union to form a sole monopoly in the domestic telegraph field. There is still pending in Congress a parallel proposal to merge competing American interests in the international telegraph, cable, and radiogram fields, in order to compete more effectively with foreign cable and radio communication monopolies, most of them government owned.

More recently an interesting conflict of opinion has sprung up between the Federal Power Commission and the Justice Department over a merger in the natural gas pipeline field. This could have repercussions on other federally regulated utility enterprise, if the controversy should go up to the U. S. Supreme Court for final disposition.

This conflict is an honest difference of opinion. Both the FPC and the Justice Department think they are right and both can marshall good arguments for their respective points of view. The case involves the plant of one natural gas pipeline company in the Southwest to absorb another. El Paso Natural Gas Co. began to woo Pacific Northwest Pipeline Corp. in 1957. It bought up Pacific Northwest stock on the assumption, apparently, that there was nothing illegal about this. The Justice Department's anti-trust division, however, said that this violated Section 7 of the Clayton Anti-trust Act and started suit.

El Paso next bought up some of Pacific Northwest's assets which required approval of the FPC, under the Natural Gas Act. On the day before Christmas, the FPC OK'd a complete merger. It agrees that there should be only one big pipeline operation where formerly there were two smaller ones. This is the very premise of the law which FPC administers—that monopoly is sometimes in the public interest—*provided*, it is regulated by a watchdog commission of which FPC is one.

The Justice Department is reported to be dissenting to this, along with the State of California. It prefers the anti-trust approach. It doubts whether the FPC's regulation really will protect the public as well as competition be-

tween the two former competitors. Some of the active young lawyers in the Justice Department profess some suspicion as to whether the FPC is going to be too solicitous for the welfare of the businesses they regulate. In one sense, this may be a part truth. Historically, as the regulatory commissioners get to know the management problems of the businesses they regulate, they become more conversant, if not sympathetic, with the management point of view. But the FPC's argument to this would be that any regulator worth his salt would make it his business to become familiar with the problems of a regulated business.

What will come of this? It could mean a showdown in the federal courts. If the Justice Department pursues its anti-trust suit to a point of seeking a federal injunction, El Paso can use the argument that it is following a course duly authorized by the FPC under the Natural Gas Act, and that it is none of the business of the Justice Department to interfere under the anti-trust laws. The Justice Department would probably reply that when the elimination of competition threatens the public interest, the anti-trust restrictions should apply, regardless of other regulatory approval.

And so the over-all question whether federal commission regulation is sufficient protection of the public interest (so as to be excluded from the realm of anti-trust prosecution) will be for the courts to decide. And if such a case goes before the present U. S. Supreme Court, it is anybody's guess which view would prevail. If the court should decide that the regulation of corporate organization of public utilities is subject to over-all restrictions under the anti-trust laws, other regulated industries—railroads, electric utilities, and even perhaps telephone companies—might be given cause for concern. It is true that the Federal Communications Act seems to spell out the authority of the FCC to approve of the merger of regulated communication interests more clearly, as distinguished from anti-trust proceedings against non-regulated competitive industries.

But would the argument stop there? If large-scale competition is a better way of protecting the public interest in the gas pipeline business, why should it be otherwise in the railroad, electric, and telephone industries. This theory of the benefits of competition would seem to be contrary to the old theory of commission regulation which was fought out and settled with the establishment of such commissions decades ago. It will be an interesting case to watch. And needless to say a good many people are watching it.

Convention Calendar

1960

Association	*Date*	*City*	*Hotel*
Minnesota	Feb. 7, 8, 9 and 10	St. Paul	St. Paul
Mississippi	Feb. 15 and 16	Unannounced	Unannounced
Louisiana	Feb. 24 and 25	New Orleans	Jung
Kentucky	Mar. 1	Lexington	Phoenix
Texas	Mar. 7 and 8	Dallas	Baker
Ohio	Mar. 28, 29, and 30.	Columbus	Deshler Hilton
Iowa	Apr. 5 and 6	Des Moines	Ft. Des Moines
Nebraska	Apr. 19 and 20	Omaha	Sheraton-Fontenelle
Indiana	May 4 and 5	Indianapolis	Claypool
Wisconsin	May 10 and 11	Milwaukee	Plankinton House
Illinois	May 19 and 20	Springfield	Abraham Lincoln
Kansas-Missouri*	May 23 and 24	Kansas City	Town House
Pennsylvania	June 6 and 7	Bedford Springs	Bedford Springs
California	June 8, 9 and 10	San Francisco	Fairmont
Washington-Oregon*	June 16 and 17	Portland	Sheraton Portland
New York	June 20, 21 and 22	Schroon Lake	Scaroon Manor
Tennessee	Sept. 7 and 8	Nashville	Hermitage
Michigan	Sept. 12 and 13	Mackinac Island	Grand
Rocky Mountain	Sept. 14, 15 and 16	Denver	Hilton
North Carolina	Oct. 4 and 5	Pinehurst	Carolina
USITA	Oct. 9, 10, 11 and 12	Chicago	Conrad Hilton
Oklahoma	Nov. 9 and 10	Oklahoma City	Skirvin

*Joint Convention

Educational Broadcasts via Plane

Two days before last Christmas, the FCC approved a spectacular experiment in airborne educational television. It serves to remind us that there are more ways beside telephone wires or wireless radio relay for transmitting point-to-point communications. The FCC has approved a proposal to use flying airplanes in the manner of captive satellites to relay educational programs over a tier of middle western states.

The commission authorized Purdue University to use eight ultra-high frequency (UHF) TV channels in the test which will involve the use of planes as relay stations to transmit educational programs over 34,000 square miles surrounding Montpelier, Ind. The area includes portions of Indiana, Illinois, Kentucky, Michigan, Ohio, and Wisconsin. It takes in more than 13,000 schools attended by more than five million students.

The operating permit for the experiment, costing some 7 million dollars, was issued for the 1960-61 school year starting next September. The university will obtain two DC-7 planes for the experiment, but only one will be used at a time.

Four transmitters on the Purdue campus will send two simultaneous programs to the plane, which will travel in a 10-mile circle 23,000 feet above Montpelier. The plane will be equipped to retransmit these programs to classrooms throughout the service area.

Purdue will invite schools throughout the area to participate in program reception. Grants from the Ford Foundation and others will supply Purdue with $3,190,000 for equipment and $3,810,000 for operation of the system.

Premonition

"Nearly every motorist who has done late night driving can recall instances where he has dozed for a fraction of a second. Your eyes close, the head dips, then you straighten up with a sudden awareness bordering on panic. It might take only the time for a snap of the finger to regain control. In such an experience, you brush against the wings of death." — Waltham (Mass.) *News-Tribune.*

Color Standards for Plastic-Insulated Communication Cables and Wires

*By C. R. Ballard and W. W. Newman Jr.**

THE OUTSIDE PLANT used in telephone systems has undergone revolutionary changes in its general make-up during the past decade. One of the major changes has been the widespread acceptance of plastic insulations and jackets in the design of cables. These new materials were introduced into cable construction about 10 years ago.

The evolution of plastic-insulated cables during the past 10 years has been both rapid and phenomenal. The introduction of new and improved polyethylenes and the improvement of manufacturing techniques have resulted in cables having better electrical and physical properties. By 1959, 85 per cent of all cables used in the REA Program were plastic-insulated.

One recent improvement in cable designs has been color coding of the cable pairs to render each pair readily distinguishable from all other pairs in the cable. This color coding of pairs eliminates the necessity of electrical testing to establish the identity of the pair and consequently substantially increases the speed of splicing. This increased speed is directly evidenced by a reduction of cost for splicing and loading of cables, and placing terminals for distribution purposes. Substantial operational benefits and maintenance savings are obtained where color coding is used.

At the time color coding was introduced into plastic cable designs the manufacturing processes had improved to the point where 100 per cent good pairs could be produced so that so-called "even count" cables[1] were adopted as a standard. This eliminated the special treatment and bookkeeping confusion which has always been associated with the spare pairs in terminals, distribution frame terminations, etc. The advent of "even count" cables simplified the problem of fully color-coded cables.

Selection of Colors

During the latter part of 1957 several discussions were held with officials of the American Telephone & Telegraph Co., and with manufacturers of plastics and color pigments, regarding colored polyethylene and polyvinyl chloride compounds.

We were informed by the American Telephone & Telegraph Co. of the basic color code which they proposed to use. This basic code employed 10 standard colors. The use of 10 standard colors (in color-coded groups of 25 pairs) permits individual identification of up to 600 pairs under one sheath.

In practice, purely for the reason of physical size, plastic cable used by REA has generally been restricted to 400 pairs. Discussions with the manufacturers of plastics and pigments indicated that sufficient research had been conducted to insure that suitable colored plastics as proposed in the new color code could be made available.

Numerous discussions with manufacturing representatives of the wire and cable industry indicated the desirability of an industry-wide standardization of a single color code. The color spacing selected is in close agreement with the recommendations of the Vision Committee of the National Research Council.

After the introduction of the standard color code for cable conductors in early 1958, there was a general trend in the industry to use the same color code for outside distribution wire and station wiring. This was desirable simply because splicers, outside plant construction and maintenance personnel, and station installers could benefit by having to learn only one color code.

The use of outdoor vinyls presented a problem in deriving a single color code for all plastics. Outdoor exposure of vinyls necessitated extreme care in the choice of antioxidants and pigments to insure maximum weatherability of the materials. Studies of colored vinyl compounds by the industry and the Bell Laboratories over a number of years have indicated that certain formulations are acceptable for use.

However, the colors which are obtainable are not ideal from a color standpoint. The vinyl red, for example, does not look like the polyethylene red. We hope that outdoor vinyls may be improved from the standpoint of ideal color selection, so that ultimately the colors for polyethylenes, outdoor polyvinyl chlorides and indoor polyvinyl chlorides will be identical.

Problems With Colored Plastics

Introduction of these new designs of cables[2, 3] into general use has brought with it new problems for the consumer, the producer, and particularly for agencies preparing specifications to cover the end-use requirements for both physical and electrical characteristics of this product. The introduction of 10 different colors used in wires and cables insulated with polyethylene and polyvinyl chloride not only brought new problems but also intensified some of the existing ones. The following were some of the more significant considera-

*Mr. Newman is assistant chief, staff engineering, REA, and Mr. Ballard is outside plant engineer, telephone engineering and operations division, also of REA. They presented this paper at the recent Eighth Annual Symposium on Technical Progress in Communication Wires and Cables, held in Asbury Park, N. J. Other reference footnotes at end of article—page 47.

tions after the color code was introduced:

(1) Uniformity of electrical properties of the pairs with 10 different colored conductors.

(2) Resistance to fading of the insulated conductors to insure long life of the color coding.

(3) Uniformity of colors from one manufacturer to another.

(4) The selection of a suitable system for specifying colors and color tolerances in cable and wire specifications.

Electrical Property Uniformity

Continuing advancements in voice frequency repeaters have improved their quality and have made substantial reduction in cost. Loaded, repeatered trunk circuits are now involved in some 15 per cent of all new cables installed in REA borrowers' telephone systems. Indications are that loaded, repeatered trunk circuits, both extended area service and toll, will increase. The necessity of uniform mutual capacitance is expressed in terms of maximum gain obtainable from repeaters.'

Capacitance variation in cable pairs has a direct effect on the structural return loss of the circuit which dictates the amount of gain that can be obtained from repeaters before singing or echo occurs. This problem has been experienced in a general way over the past years. In most cases, it has been necessary to make capacitance-deviation test splices to obtain the desired capacitance uniformity.

Prior to color coding, cable pairs were all random spliced so that additional benefits in high return loss were obtained. This factor was lost entirely with the introduction of color coding where color-to-color splicing was employed.

Random splicing of color-coded cable could be employed on trunk circuits but this would destroy the color code for the entire cable. However, since most trunk cables in REA-financed systems also contain subscriber circuits, we are not willing to make this sacrifice unless absolutely necessary.

In short, many variables affecting capacitance uniformity existed prior to color coding, such as conductor diameter variations, uniformity of wall thickness of plastics on conductors, and uniformity of twining and stranding of conductors.

The use of colored plastics for conductor insulation could also adversely affect capacitance uniformity if improper pigments are used and if poor dispersion of these pigments is obtained.

Discussions with manufacturers of polyethylenes indicate that with the use of proper pigments and proper dispersion it is now possible to obtain very uniform capacitance. An indication of this uniformity is as follows:

Colored Polyethylene Insulations

Color	*Dielectric Constant*	*Color*	*Dielectric Constant*
Blue	2.296	White	2.297
Orange	2.290	Red	2.289
Green	2.296	Black	2.305
Brown	2.298	Yellow	2.295
Slate	2.292	Purple	2.290

Resistance to Fading

It will be necessary that the colored polyethylenes and polyvinyl chlorides provide readily distinguishable color identification of each individual pair throughout its life in plant. We do not expect that polyethylene-insulated conductors will be exposed unduly to sunlight. We do expect, however, that short-term exposure to sunlight of polyethylene conductors at splice and terminal points, as well as the use of polyethylene conductors for terminations directly on the main frame, could cause some problems with fading of the conductors.

The most significant problem associated with fading of the conductors will be encountered with outdoor polyvinyl chlorides. The direct exposure of wires jacketed with colored vinyls is a severe test of both the aging characteristics of the materials, and the permanency of the colors. The problem here is to select compounds specifically designed for outdoor use and color pigments so resistant to fading in direct sunlight that pair identification will be possible over the life of the wire.

Extensive studies by Bell System engineers and vinyl compound manufacturers have resulted in the selection of base compounds and pigments which appear to have satisfactory aging characteristics. The requirement of providing protection against sunlight necessitates selection of some colors that do not agree with polyethylene colors.

Some samples of wires wherein the manufacturer had utilized proper compounds and pigments were examined and found to be unsatisfactory. Poor dispersion of the color pigments had resulted in weak and variable colors, as well as the degradation of electrical properties.

The colored polyvinyl chlorides used as insulation on station wiring, which is not exposed to sunlight, have less stringent fading and durability requirements and consequently will permit the use of colors corresponding to the polyethylene colors.

Uniformity of Colors

Since the introduction of fully color-coded plastic cables in the REA Program, careful examination of cables produced by different cable manufacturers has indicated a wide variation in the colored polyethylenes used as conductor insulation.

For example, the brown insulation produced by one manufacturer may look very much like the orange insulation produced by another manufacturer. This presents serious problems in identifying colors for splicing, terminating, etc., when all the cable used on a project is not purchased from the same supplier.

The REA specifications now attempt to set forth performance requirements, both physical and electrical, to assure a uniform product from manufacturer to manufacturer. However, the present requirement is that colors shall "be readily distinguishable."

This does not satisfy the ideal uniformity of colors and would indicate that a means must be found to specify color tolerances that can be administered by manufacturers, inspectors and purchasers to obtain adequate and uniform colored insulations. The mere designation of basic colors in the specifications is not sufficient. The desired color and the tolerances for each color must be set forth so as to be easily understood. Color matchings must be made without the use of skilled laboratory technicians and expensive colorimetric equipment.

Some difficulties have been found by manufacturers in the mixing of their own colored compounds even though proper compounds and pigments were utilized. Poor dispersion of pigments can affect the dielectric strength of the material, the uniformity of color, and the uniformity of capacitance. Metering in the extruder, unless pigments have been properly predispersed, has generally resulted in weak or poor colors.

Specifying Colors, Tolerances

A number of color systems and collections of color samples are in existence. Most of these fall into one of three basic categories. One is a colorant mixture system, produced by systematic mixtures of colorants such as paints, inks, dyes, etc.

Another is the color mixture system, produced by additive mixtures of colors, often by disk mixture.

The third type is the color appearance system, produced according to the visual relationship between colors.

Some of the characteristics considered in selecting a color system were:

(1) The system should be nationally recognized and readily comprehended by the average color matcher and inspector.

(2) Materials required to implement this system should be readily available at reasonable cost.

(3) The system should lend itself to written specifications and should be

sufficiently versatile to allow necessary and periodic changes.

(4) The system should specify color according to its visual (appearance) attributes, rather than physical attributes (dominant wave length, purity and reflectance) because the users will be concerned with appearance.

(5) Tolerances, in visual units, should be easily specifiable.

Several color systems were evaluated on the above characteristics. Only one system met all of the requirements. This system was discussed with the National Bureau of Standards, with several manufacturers of wire and cable, and with manufacturers of plastics. It is known as the Munsell System of Color Notation.

The Munsell System

The Munsell System[5, 6] is essentially a scientific concept for describing and analyzing color in terms of three attributes, identified in this system as Hue, Value and Chroma. The method of color notation developed by A. H. Munsell, as the principal feature of this system, arranges the three attributes of color into orderly scales of equal visual steps, so that the attributes become dimensions of parameters by which color may be analyzed and described accurately under standard conditions of illumination.

The color that is normally associated with an object is actually a combination of the color quality of the light incident upon it, the color reflecting qualities of the object itself and the color vision of the observer.

Color judgments should therefore be made by an observer with normal color vision and under a suitable light source.

The colors were selected according to their appearance under C.I.E. Illuminant C, equivalent to average north daylight having a color temperature of approximately 7400° Kelvin and this is the illuminant recommended for use with these charts. Personnel working with this color specification should be tested using a suitable color vision test instrument.

Chromatic colors in the Munsell System of Color Notation are divided into five principal classes which are given the Hue names of red, yellow, green, blue, and purple.

A further subdivision yields the five intermediate Hue names of yellow-red, green-yellow, blue-green, purple-blue, and red-purple, which are combinations of the five principal Hues. Capitalized initials such as "R" for red, "YR" for yellow-red, are used as symbols for the Hue names.

When finer subdivisions are required, the 10 Hue names, or symbols, may again be combined to produce such combinations as red-yellow-red, which is symbolized "R-YR."

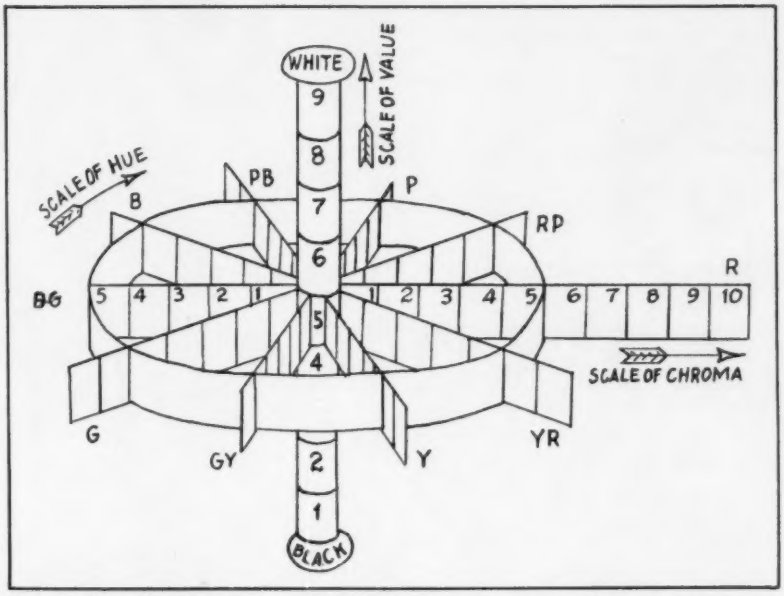


Fig. 1. Munsell Color System. Hue, Value and Chroma in their relation to one another. The circular band represents the Hues in their proper sequences. The upright center axis is the scale of Value. The paths pointing outward from the center show the steps of Chroma, increasing in strength as indicated by the numerals.

For even finer subdivisions, the Hues may be divided into 10 steps each (1R to 10R and 1YR to 10YR), thus increasing the Hue notation to 100. Hence, the Hue notation of any color indicates its relation to the five principal and intermediate Hues or any of their subdivisions.

The value notation indicates the degree of lightness or darkness of a color in relation to a neutral gray scale, which extends from a theoretically pure black symbolized as 0/ to a theoretically pure white symbolized as 10/.

A gray or a chromatic color that appears visually half-way in lightness between pure black and pure white has a Value notation of 5/. Lighter colors are indicated by numbers ranging above five, while darker ones are indicated by numbers below five.

The Chroma notation of a color indicates the strength (saturation) or degree of departure of a particular Hue from a neutral gray of the same value. The scales of Chroma extend from /0 for a neutral gray out to /10, /12, /14, or farther, depending upon the strength or saturation of the individual color. A color classified popularly as "vermilion" might have a Chroma as strong as /12, while another color of the same Hue and Value classified popularly as "rose" might have a Chroma as weak as /4.

The complete Munsell notation for any chromatic color is written Hue Value/Chroma, or symbolically H V/C. A particular sample of vermilion might then have a Munsell notation of 5R 5/12, while a particular sample of rose might have a notation of 5R 5/4.

Whenever a finer division is needed for any of the three attributes, decimals may be used, such as 2.5R 4.5/2.4.

The notation for a neutral gray is written N V/. A very dark neutral (black) would be written N 1/0, and N 9/0 would be the notation for a very light neutral (white).

For grays of slight chromaticity, the notation is written N V/(H,C), using only the symbols for the 10 major Hues to indicate the Hue; thus a gray of a slightly yellowish appearance is written N 8/(Y 0.4).

The Munsell System of Color Notation can be thought of in terms of a color solid or color space in which the Value scale runs vertically from a theoretically pure black at the bottom to a theoretically pure white at the top, while the various Hues are located around it, describing an approximately cylindrical shape with the Neutral Value scale in its center. The Chroma scales radiate from the vertical Value scale in the center to the periphery of the color solid in equal visual steps *(Fig. 1)*.

Cable, Wire Color Standards

The REA color specification is written in terms of the Munsell Color System and specifies for each color a region in the three-dimensional Munsell color space depicted in *Fig. 1*.

For each color region the central color (centroid) and six tolerances are specified, two tolerances for each of the attributes of Hue, Value and Chroma. These tolerances represent the maximum permissible deviation from the centroid and are defined as follows:

Hue Plus (H+)—Refer to the circular band of hues in *Fig. 1*. The clockwise direction around this circuit, R, YR, Y, GY, G, etc., is the H+ direction. The H+ color represents the limit for hue deviation in the H+ direction from the centroid.

Hue Minus (H–)—H– is the counterclockwise direction around the hue circuit. The H– color represents the limit for hue deviation in the H– direction from the centroid.

Value Plus (V+)—V+ is the lightness tolerance and represents the limit for value deviation in the light direction.

Value Minus (V–)—V– is the darkness tolerance and represents the limit for value deviation in the dark direction.

Chroma Plus (C+)—C+ is the saturation tolerance and represents the limit for chroma deviation in the direction of increased saturation.

Chroma Minus (C–)—C– is the weak or gray tolerance and represents the limit for chroma deviation in the direction of grayness or reduced saturation.

A typical color specification for a red color is as follows:

Centroid	2.5R 4/12
H+	5R 4/12
H–	10RP 4/12
V+	2.5R 5/12
V–	2.5R 3/12
C+	2.5R 4/12
C–	2.5R 4/10

Note that in the case of each tolerance color two attributes remain constant with the centroid while the third attribute is varied. *Fig. 2* shows these seven colors arranged on a two-dimensional chart in such a manner that each tolerance is juxtaposed to the centroid. An inspector comparing a sample color to this chart would proceed as follows:

(1) Compare the sample to the centroid. Is it darker or lighter? Assuming it to be lighter, compare it to the V+ color to determine if it is darker or lighter than this lightness limit. If it is lighter than the light limit (V+) it fails to meet the specification.

If it is between the centroid and the light limit, it meets the specification for value. If the sample were darker than the centroid, the same procedure would be followed with the V– color.

(2) Again compare the sample to the centroid. Is it more saturated or more gray (desaturated) than the centroid? Assuming it is more gray (desaturated) than the centroid, compare it to the C-color to determine if it is more gray than this gray limit.

If it is more gray than this gray limit (C–) it fails to meet the specification. If it is between the centroid and the gray limit, it meets the specification for chroma. If the sample were more saturated than the centroid, the same procedure would be followed with the C+ color.

(3) Again compare the sample to the centroid. Is it, in the case of a red sample, more red-purple or more yellow-red than the centroid? Assuming it is more yellow-red (orange) than the centroid, compare it to the H+ color to see if it is more yellow-red than this yellow-red limit.

If it is more yellow-red than this limit, it fails to meet the specification. If it falls between the centroid and the yellow-red limit, it meets the specification for hue. If it were on the red-purple side of the centroid, the same procedure would be followed with the H– color.

The inspector has compared the sample to the centroid and determined how it differs from the centroid in terms of the visual attributes of hue, value and chroma. He has then compared the sample to the appropriate limits for these attributes to determine if it falls within these limits.

The usual situation is that the sample will not only differ from the centroid but will differ in all three attributes. However, because these differences are along visual parameters, the inspectors can make independent color judgments for each attribute in order to determine compliance with the specification.

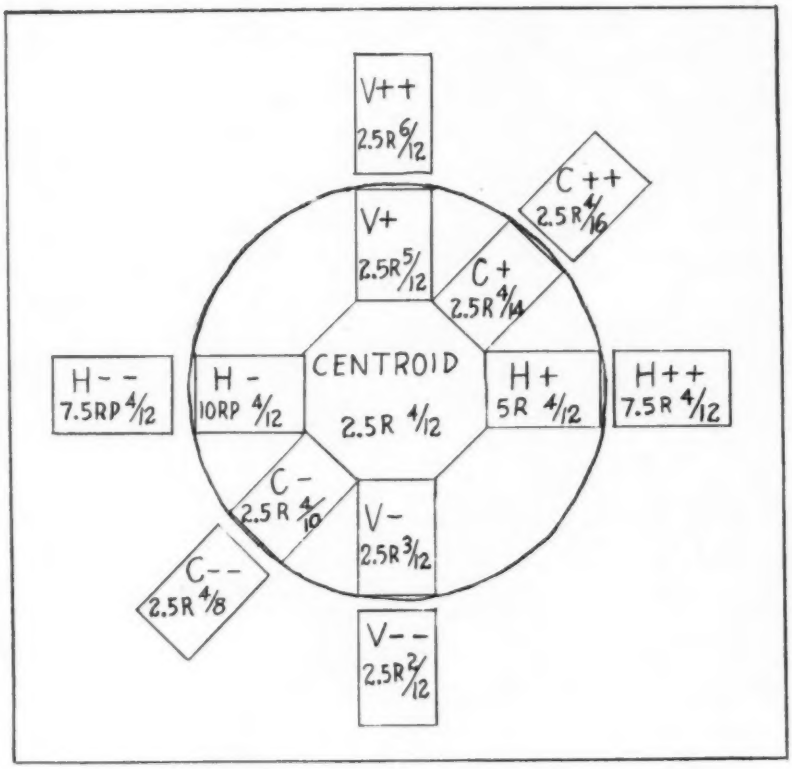


Fig. 2. Munsell color notations. Polyethylene chromatic colors.

In addition to the seven acceptable colors, *Fig. 2* shows six unacceptable colors. Note that the acceptable colors are surrounded by a circle. All colors outside the circle are unacceptable colors. These six colors represent extensions of the various attributes beyond the permissible limits.

These unacceptable colors are shown to assist the inspector in determining the position of his sample with reference to the centroid and the permissible limits. Colors that fall between the permissible limits and these unacceptable colors are, of course, unacceptable.

Neutral colors are those having no hue and little or no chromaticity. They have essentially only value (lightness or darkness) and fall on the neutral value pole which runs from black to white in Fig. 1.

For these neutral colors, a slightly different type of specification must be written. Any color deviation from a true neutral results in the color having hue and chroma, in addition to value.

Tolerance specifications for neutrals are written in terms of permissible deviation from true neutral in any hue direction. Neutrals also have value tolerances.

(Continued on page 46)

T.O.P.* TOPICS

By WINNIE B. BURNETT

Part 4

Let's Help Our VIC's**

TAKE GOOD care of your PBX customers, for the job you save may be your own! We are all aware that heavy toll users, such as most PBX customers, are indeed *Very Important Customers*. However, all too few of us really place enough importance on the necessity for maintaining satisfactory relations with the PBX customers and attendants. Lack of understanding breaks down good relations and often creates hostility between PBX users and telephone company employes. The inevitable result of such a breakdown is poor service and general chaos.

Recently, a well-known telephone (traffic) personality predicted that, within 25 years, operator offices will be a thing of the past; that *PBX operators*, employed by the telephone company, will attend the PBX boards to handle any calls requiring assistance. He also predicted that charges for such operator service will be included in the monthly rental of the PBX equipment. This far-seeing gentleman sees calls to other planets becoming as commonplace as today's overseas calls.

Now don't start the "Oh pooh—not in my day" routine, because the man who made these (and other) startling predictions is no soft-eyed dreamer—he's a hard-working, future-thinking traffic superintendent. He seems to be of the "hindsight may be better than foresight, but looking back will not keep you from running off the deep end" school of thought.

No matter what your thoughts may be, there is a "new look" for communication in the making. As we read and hear of all the technical and scientific developments, we realize that traffic people must devise methods and procedures to make our part of telephone service more versatile and pleasing.

With emphasis on suburban development, many small telephone companies are waking up to the fact that big business may locate in their small town. Big business means a demand for adequate telephone facilities and *good* telephone service. Also, big business usually requires some inter-company means of communication, such as PBX service.

This growing demand necessitates some special services from the telephone company, for we must train these users in the fine art of "Operation PBX." Such training is a must for attended PBX boards, and is a helpful, courteous service for smaller systems.

The following paragraphs are a suggested outline for courteous and helpful service to our *Very Important Customer*, the PBX.

Purpose. In order to insure that the service given at private branch exchanges is satisfactory, and to assist the extension users in using the telephone to the best advantage, a routine should be followed and regular visits to PBX boards should be made by the telephone company PBX advisor, or someone versed in PBX operation.

Usually, the chief operator will act as PBX service advisor, for she must be well informed and ready to tactfully handle the many conditions with which she may be confronted when dealing with customers and attendants. She must have a good knowledge of the PBX operation and the training of

(Continued on page 58)

*Traffic Operating Practice
**Very Important Customers

Previous articles in this series have appeared in the Dec. 5, Dec. 12 and Dec. 26 issues.

BDSA Estimates 5.7 Per Cent Station Gain for 1960

THE DOMESTIC telephone operating industry has moved steadily upward, following a slight lull in 1958 because of the recession, the Business & Defense Services Administration, U.S. Department of Commerce, reported recently. A 3 million gain in the number of telephones in the first nine months of 1959 equalled the increase for the full year of 1958. The estimated gain for 1959 will bring the number of telephones in the U.S. to about 70,600,000, a 4 million increase. The gain for 1960 may reach 4.2 million telephones, or 5.7 per cent more than the 1959 increase.

Operating revenues, according to the BDSA report, have been increasing annually, and in 1959 should reach a little more than 8 billion dollars. Trends for 1960 indicate at least a 6 per cent increase. Construction of buildings and outside plants is accelerating after a slight decline in 1958 and 1959, the annual average construction expenditures for those years being 2.5 billion dollars. The estimated figure for 1960 is 2.85 billion dollars.

The BDSA gave the following background of the telephone industry:

"The domestic telephone operating industry reflects national economic trends and changes in the pattern of living, and could be considered as a barometer of general business conditions. However, there is a lapse of time before changes in the business climate are felt in the telephone industry.

"More than 4,100 companies supply communications service in the U.S. Each serves a particular geographic area and is interconnected with a nationwide network.

"Intrastate operations are usually controlled by state commissions and interstate communications by the Federal Communications Commission. This control limits the carriers in their rates, expenditures, and other financial operations. Justification for rates and construction expenditures must be demonstrated."

The number of telephones in service per 100 population has steadily increased, despite a lull in 1958:

Year	Number	Per cent increase over previous year	Number per 100 of population
1953	50,373,000	4.8	31.3
1954	52,814,000	4.8	32.2
1955	56,243,000	6.5	33.7
1956	60,190,000	7.0	35.4
1957	63,621,000	5.7	37.1
1958	66,630,000	4.7	38.1
1959 (Est.)	70,560,000	5.9	39.75
1960 (Est.)	74,790,000	5.7	41.7

The growth in the number of telephones may be the result of the slowdown of the economy in 1957-58, which prompted an active merchandising campaign, the report commented. Another factor is plant-site dispersion in recent years in cities and towns under 50,000 population, outside of metropolitan areas. The demand for telephone service for these plants and for the personnel employed in them has resulted in the increased installation of telephones.

Another factor in the promotion of telephone usage is the great extension of telephone services: secretarial answering, tele-metering, data processing, data transmission, TWX service, leased facilities, and PBX combinations.

Plant investment is steadily increasing, and at the end of 1958 amounted to 24 billion dollars. Based on preliminary figures for the first half of 1959, the year's total should approximate 26 billion dollars. Construction expenditures in recent years have been as follows (in billions of dollars):

Year	Amount
1956	2.6
1957	2.9
1958	2.6
1959 (Est.)	2.5
1960 (Est.)	2.9

Because of the demand for telephones and the expansion required for the increased use of telephone services, 1959 construction is filling the gap caused by the slowing of expansion plans during 1958, the BDSA commented.

Total taxes paid from revenues of the operating communications industry in 1958 approximated $1,620,000,000, and 625 million dollars in federal excise taxes were collected and paid to the federal government.

The continued increase in capital investment and the expansion of facilities and services of the operating telephone industry have raised gross revenue. In 1958, revenue amounted to more than 7.7 billion dollars; in the first six months of 1959, it was about 4.1 billion dollars, and at this rate should approximate 8.2 billion dollars for the year. Revenue should increase in 1960 by more than 700 million dollars, or to a total of about 9 billion dollars.

Employment in the industry, the report said, clearly reflects technical developments and automation. The business slowdown in 1958 was followed by a reduction in the number of employes to a little over 700,000. A gain of 1 per cent by the end of 1959 is expected and the outlook is for a sharper rise—

(Continued on page 60)

Average Daily Conversations

Year	Toll	Exchange	Total	Increase in total from previous year
1953	6,615	179,685	186,300	5,200
1954	6,870	186,530	193,400	7,100
1955	7,780 (Est.)	197,020 (Est.)	204,800	11,400
1956	8,450 (Est.)	208,150 (Est.)	216,600	11,800
1957	10,240	219,314	229,554	12,954
1958	9,205	239,849	249,054	19,500
1959 (Est.)	10,000	256,000	266,000	17,000

(000 omitted)

Table 1

Average daily conversations are now nearly 266 million, of which 10 million are toll calls. Toll calling, which reflects to some degree the economic climate, fluctuates with general business conditions. Because many large cities in recent years have developed metropolitan exchange areas and calls formerly considered toll are now considered local exchange, toll calls are decreasing and local exchange calls are increasing, proportionately, as is evident from the tabulation of average daily conversations shown in *Table 1.*

Loans Totaling $2,893,000 Authorized by REA

SEVEN TELEPHONE loans approved by the Rural Electrification Administration during the two weeks beginning Dec. 14 will help finance new or improved telephone service to 5,634 subscribers as follows:

Wiggins (Colo.) Telephone Association; $457,000; Dec. 18.

This loan will aid in providing initial service to 325 subscribers and improved service for 82 subscribers. As a nucleus for this service, the cooperative proposes to acquire 6 miles of toll line from the Mountain States Telephone & Telegraph Co. The line extends from Buckingham to New Raymer.

In addition, the owner-subscribers of the Farmers Mutual Telephone Co., Briggsdale, have agreed to dismantle their lines and take service from the borrower. The Farmers company presently serves 80 subscribers, and the toll line two.

Construction plans of the borrower include new dial central offices at Briggsdale and New Raymer.

This borrower has now received a total of $680,000 in REA loans to furnish new and improved telephone service to 808 subscribers. The system, when complete, will consist of four dial exchanges. Those at Hoyt and Wiggins are now providing service to approximately 315 subscribers.

Robert A. Baer Sr. is president and Lynn L. Hendrickson is manager of the Wiggins association.

•

Standard Telephone Co., Cornelia, Ga.; $792,000; Dec. 22.

Proceeds from the loan will go towards furnishing initial service to 1,549 subscribers.

Approximately 1,345 of the new subscribers will be located in the present Dahlonega exchange where the borrower plans to expand both its dial facilities and outside plant. The remaining 204 will be located in the Suches vicinity, which now has no telephone service. The company proposes to create a new exchange at Suches and to construct a new dial office building there to serve the additional subscribers. Funds are also included in this loan to build a new headquarters-exchange building in Cornelia.

REA loans approved to this borrower now total $2,334,000 which will bring new and improved service to 6,833 subscribers. The system will consist of 11 dial exchanges, nine of which are now furnishing service to approximately 5,000 subscribers.

H. M. Stewart is both president and manager of the Standard company.

•

Mid-Missouri Telephone Co., Gilliam; $168,000; Dec. 22.

Funds will be used to improve service for 160 existing subscribers and to furnish initial service for 157 subscribers. The existing subscribers now receive magneto service from the Speed Telephone Co. which the borrower plans to acquire.

A new dial central office will be constructed at Speed to replace the present facilities. A portion of the loan will be used to complete the authorized system.

REA loans to the Mid-Missouri company now total $1,105,000 which will benefit 2,185 subscribers. Four of the proposed seven exchanges are now furnishing dial service to approximately 960 subscribers.

H. A. Jones is president and manager of the Mid-Missouri company.

•

Palo Pinto (Tex.) Telephone Co.; $301,000; Dec. 22.

This loan will help to improve service for 160 existing subscribers and to furnish initial service to 241 subscribers. The loan also will enable the borrower to complete its authorized system.

The existing subscribers now receive magneto service from the Santo Telephone Exchange. The borrower has recently acquired this facility and will be reimbursed for the acquisition. The borrower plans to construct a new dial central office to replace the Santo magneto facilities.

This borrower has now received REA loans totaling $554,000 which will enable it to serve 861 subscribers. Three of the proposed four dial exchanges are now furnishing service to more than 400 subscribers.

Jess H. Turner Jr. is both president and manager of the Palo Pinto company.

•

Southern Tier Telephone Co., Inc., Apalachin, N. Y.; $648,000; Dec. 23.

The borrower plans to use this loan to improve service for 755 subscribers and to furnish initial service for 932 subscribers in New York and in Pennsylvania.

The new borrower plans to acquire the Lockwood (N. Y.) Telephone Co. and the Apalachin Telephone Co. through the issuance of common stock and with its own funds.

The borrower proposes to retain the Lockwood dial facilities in place, and replace the Apalachin manual equipment with a new dial central office. The borrower also plans to construct new headquarters, including garage and warehouse facilities at Apalachin. Refinancing will account for a portion of the funds included in this loan.

Edward J. Nowicki is president of the Southern Tier company.

•

Camden (Mich.) Rural Telephone Co.; $122,000; Dec. 24.

This loan will help improve service for 185 existing subscribers and furnish initial service to 78 subscribers. The existing subscribers receive magneto service through the Cambria (Mich.) Rural Telephone Co. which the borrower proposes to acquire.

A new dial central office will be constructed at Cambria. This borrower has now received REA loans totaling $655,000 which will make possible new and improved service for 1,435 subscribers in Michigan and in Ohio. The system will consist of four exchanges in Michigan and one in Ohio. All are in operation, except Cambria, furnishing dial service to approximately 1,000 subscribers.

Mont Fowler is president of the Camden company and Eugene Mallar is manager.

•

United Utilities of West Virginia, Davis; $405,000; Dec. 24.

Funds will aid in improving service for 692 existing subscribers and in furnishing initial service to 318 subscribers. The existing subscribers are now being served by the Marion Telephone Co. The borrower plans to acquire this company.

A new dial central office at Worthington will be added to the system. REA loans to this borrower which now total $1,210,000 will enable it to provide new and improved service to 2,676 subscribers. When complete, the system will consist of four exchanges.

Edward S. Filler is both president and manager of the United Utilities of West Virginia.

THE Operator's Corner

By MAYME WORKMAN — TRAFFIC EDITOR

AN INTERESTING item appeared in the Winter 1959 issue of the AT&T *Share Owner's Quarterly.* The pamphlet introduced the "Call Director," the Bell System's newest telephone designed especially for business use.

The call director is a push-button telephone for the person who *makes* a lot of calls or *takes* a lot of calls. The model featured in the quarterly has 30 buttons, the other model available has 18.

Many convenient features can be incorporated. For example:

You can save dialing the most frequent inter-office calls . . . signal other telephones in the office . . . and bring people into conference by telephone. And the call director is perfect for the secretary or clerk who answers the telephone for a number of people.

All this in a *single* space-saving unit which replaces *several* pieces of telephone equipment.

The call director comes in four colors —ivory, green, beige, and gray.

The pamphlet also contained the following interesting information: 96 per cent of AT&T's shareowners are individuals. About half the shareowners hold 15 shares or less, and the average holding is 43 shares. *More than 700,000 shareowners are women.*

AT&T shareowners now number more than 1.6 million.

Another interesting story which attracted the writer's attention recently was captioned, "They Go to School by Phone." It appeared in a recent issue of *Family Weekly.*

According to the article, the first program of education by telephone was initiated 10 years ago between Boston University and the Veterans Administration Hospital at Rutland Heights, Mass.

In the past 10 years, more than 12,000 handicapped students from every state in the union have received part or all of their education by telephone.

The system, developed by Executone, Inc., in cooperation with the Bell System and Independent telephone companies, is available wherever there are telephone lines.

Costs average from $13 to $25 a month, depending on local rates and distances. More than 42 states, with education programs for the handicapped, approve of partial or full payment of the charge from state aid funds. Kiwanis, Rotary and Lions clubs, parent-teachers associations, the National Foundation, National Tuberculosis Association, National Society for Crippled Children, and other groups also have helped pay the costs.

The classroom is brought into the home in the following manner:

An intercom system, much like that used in offices, consisting of two microphone-speaker units similar to portable radios, is used. One, placed in the student's room, is connected by a regular private telephone line to the second unit in the distant classroom. By use of an on-and-off talk switch, the shut-in can take part in group and class discussions. When he leaves the switch up, he hears the teacher and his classmates. When he presses it down, they hear him.

The article reported several interviews in which shut-ins gave their opinions of the "School by Phone," system. There was Frank E. Heuttner Jr., paralyzed from the waist down as the result of an auto accident when he was 14. From that time on, he never set foot in a classroom. But he "attended" Wisconsin State College at Eau Claire, was graduated from both the School of Commerce and the Law School of the University of Wisconsin with honors and was elected to Phi Beta Kappa and the Order of Coif, law honor society.

Through the years he "went to school" only by telephone and now practices law from a wheel chair in Cadott, Wis.

Mr. Heuttner had this to say about his experience: "My family and I had given up hope that I would ever be able to continue my education. Then we saw a magazine article about the school-to-home telephone for shut-ins. I consider that article the most wonderful thing that ever happened to me.

"Today, as I look on my experience, I feel it would be impossible to overstate the importance of the school-to-home telephone hookup. At a cost of about $15 a month, borne by the Wisconsin Department of Vocational & Adult Rehabilitation, I was converted from a helpless cripple to an independent, self-supporting person."

The feeling of being "part of the gang" is brought into the life of the homebound student by the school-to-home telephone. His room broadens into a whole new world, and contact with this world does not end when school lets out. Sets can be hooked in for basketball games and other sports.

Once again, the telephone is rendering a wonderful service and opening new vistas for the handicapped.

Traffic Questions

(1) Is traffic to and from Alaska classified as overseas?

(2) Is traffic to and from Alaska handled by overseas operating practices?

(3) Which operators complete calls to the 49th state?

(4) How many toll centers does Alaska have at the present time?

(5) Which Alaska circuits are dial?

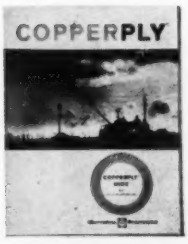
Answers to questions are on page 61.

Ripening Element

"To bring the best human qualities to anything like perfection, to fill them with the sweet juices of courtesy and charity, prosperity, or, at all events, a moderate amount of it, is required—just as sunshine is needed for the ripening of peaches and apricots."—ALEXANDER SMITH.

TAILOR-COAT COPPERPLY® CUTS WIRE COST... National-Standard COPPERPLY wire for bare or insulated telephone conductors, rural distribution wire, guy and messenger strand is steel wire plated with copper to a uniform, closely controlled thickness by a continuous electroplating process. This method produces an intermolecular bond between copper and steel.

Only COPPERPLY by National Standard is available in *a variety of copper thicknesses* that can be tailored to specific industry needs. Whether your application calls for corrosion-resistance, ohm-resistance or strength above standard, tailor-coat COPPERPLY is the most economical wire you can use because *you pay only for the copper you need*. National-Standard Company, Niles, Michigan.



Write for Bulletin 203 that lists full size data, specifications and application photographs.

COPPERPLY
NATIONAL-STANDARD

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; tire wire, stainless, music spring and plated wires • WORCESTER WIRE WORKS Worcester, Mass.; high and low carbon specialty wires • WAGNER LITHO MACHINERY, Secaucus, N. J.; metal decorating equipment • ATHENIA STEEL, Clifton, N. J.; flat, high-carbon spring steels • REYNOLDS WIRE, Dixon, Ill.; industrial wire cloth • CROSS PERFORATED METALS, Carbondale, Pa.; decorative, commercial, and industrial perforated metals.

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

THE ENGINEER in the laboratory, as well as the maintenance technician who services radio and television receivers, frequently has occasion to substitute one tube type for another and for any one of many reasons. Most tube types have equivalents in other tube types, but they are not always proper substitutes. Sometimes the characteristics differ, so that a suitable type is only good relative to the tube type for which it is being substituted, and sometimes it is poor.

Then, again, substituting one tube type for another may require changes in socket wiring. At still other times, a tube type can only be substituted for another in a particular kind of circuit.

These details are all taken care of in a paper-backed book of 352 pages titled: "Master Receiving-Picture Tube Substitution Guidebook."

This book is a composite of the original basic "Receiving Tube Substitution Guidebook," published a number of years ago, and all of the supplements which appeared from time to time in order to keep the original book up-to-date.

This new book is the most complete compilation of receiving and picture tube substitution information available anywhere. It covers 5,100 American receiving tube substitutions; 825 American-made TV picture tube substitutions, as well as 325 American-European receiving tube equivalents, and almost the same number of European-American receiving tube equivalents.

The book can be procured from TELEPHONY for $7.45.

•

According to "Science News Letter," only 2 per cent of the babies born are potential geniuses. Half of these are girls. Yet, despite our urgent national need for genius, our customary attitude about "woman's place" is such that only 8 per cent of America's scientists and engineers are women.

By contrast, one-third of Russia's scientists and engineers wear skirts. One-half of Russia's engineering students are coeds.

•

The device pictured here is a "Telecart" and is designed for use in hospitals. It may be rolled into a room or ward and up to the bed so that patients can make pay telephone calls.

A built-in reel contains 30 feet of cord that can be plugged into suitable wall outlets. The stainless steel cabinet is easy to roll, as it is mounted on ball-bearing swivel castors with rubber tires. Equipped with an all-around bumper guard, it will not mar walls or furniture.

Finished in five attractive colors, white, cream white, coral, silver or jade green, it presents a most attractive appearance.

•

Down in Atlanta, Ga., recently, we noticed a plastic film building, for temporary storage of materials used in the construction of the new air terminal. We believe that this should prove useful in some telephone construction jobs.

The warehouses are fabricated of 80 x 100-foot sheets of polyethylene film, and measure about 25 feet in height, are 40 feet wide, and 75 feet long. There are no posts or other supporting devices; 3,000 square feet of unobstructed storage space is provided. The building is anchored to the ground at the periphery and is supported in its desired shape by two air blowers.

•

We note with considerable interest that a new sealed nickel-cadmium rechargeable battery is now on the market. These batteries are available in a number of sizes and shapes, from small button cells to large rectangular types.

Sealed nickel-cadmium batteries provide a trouble-free, dependable and economical source of power. They are long-lived, will accept many recharging cycles and can stand idle for long periods of time without any damage to the battery. In addition, they are free from the routine maintenance normally associated with rechargeable batteries, such as the addition of water.

New portable communication devices requiring more energy than is economically available from primary batteries are now practical and possible with this new line of rechargeable batteries.

•

A columnist by the name of Dissinger out in San Diego, Calif., has the following to say about the use of pay telephones in Europe:

"In Denmark, you put in a 10 ore coin (1½ cents) and dial only the prefix. Then an operator comes on the line and asks for a number.

"In Germany, they have plunger type coin slots and you dial only the number.

"In France, you need a token, then dialing is like the U. S. However, there are no telephone books in France's public booths.

"In England, you put four pennies in the slot before you lift the receiver.

Then you dial three prefix letters and the number. They have a further complication. There is a button you must press after your party answers or they won't hear you. Germany has the button, too.

"None of the public booths on the continent have English instructions. Likewise, in England, they do not have foreign instructions."

•

Detroit's Harlan House, a 126-unit motel and hotel combined, is the first hostelry in the state to provide guests with the latest telephone conveniences that the Michigan Bell Co. has to offer.

A new type of service permits guests to make local and long distance calls without going through the hotel's switchboard. A guest dials "8" and is connected with the long distance operator in the Trinity exchange. To make a local call, he dials "9." This connects him with the switching equipment in the Trinity exchange. Then, he can dial the desired number.

By dialing "O," a guest can reach the hotel PBX operator. And he can obtain other hotel services (restaurant, room service, bar, etc.) by simply dialing single-digit numbers.

A message register, housed in a two-by-three-foot aluminum cabinet mounted on the hotel's desk, will automatically maintain a record of local calls. Information necessary to bill guests on long distance calls is telephoned to the hotel by the Trinity operator minutes after the call is completed.

Another feature of this modern telephone installation is the "message recall," a device that indicates to a guest that a message awaits him at the desk. The "announcer" is a tiny signal light on the color telephone set in each guest's room. If the "message-waiting" light is on, when a person returns to his room, he merely picks up the handset and requests the PBX operator for the message.

•

The Bell System is presently testing an automatic card dialer. The customer is furnished punched cards for frequently-called numbers. To place a call, the customer merely inserts a card in a slot and the number is automatically dialed. A larger model will handle cards for 300 numbers.

•

We hear a lot about wave guides these days and predictions that they will eventually come into common use to supplement coaxial cable and microwave. It is claimed that the wave guide will some day carry 200,000 telephone conversations at one time.

•

We recently observed a telephone directory printed on light blue paper. It was easy to read and rather attractive.

Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

Q. Can you inform us where we may procure a good, reasonably priced book on short-wave radio propagation?

A. We suggest a paper cover book of 160 pages by Stanley Leinwoll that is sold by TELEPHONY for $3.90.

This book presents in a straightforward manner the basic principles of shortwave radio propagation, and explains how it is used to provide long range radio communication.

After more than 15 years of practical experience with propagation phenomena, the author produced a book that is well balanced in the distribution of information on all of the subjects which are pertinent to this form of communication.

Following the exploration of a basic phenomena, the author deals with ionospheric variations attributable to sunspot cycles, as well as abnormal causes, which have so often disrupted man's ability to communicate by electro-magnetic waves.

He explains the preparation of maximum usable frequency (MUF) charts and how to use them.

A chapter is devoted to the explanation of the correlation between the seasons and the most satisfactory frequencies within the 3-to-30 mc range which are usable for interglobal communication. An interesting highlight of the book is the explanation of "one-way skip," the phenomenon which has for so long confused those who have occasion to communicate with shortwave signals.

•

Q. Can you advise us how tests are made by automatic routiners on a dial switching system?

A. Various types of automatic routiners are now available for use on dial switching systems and a variety of tests are possible.

We have information on one routiner that operates as follows:

Test calls are automatically set up from 10 test lines to 10 other test lines; thus a complete test program comprises 100 connections.

Readings provided by counters in the test machine relating to incomplete and complete calls afford a means of determining the percentage of faults and the resulting quality of service of the telephone exchange equipment.

The test machine is at all times looking at the performance of the telephone exchange equipment in the same manner as a regular subscriber.

The sampling of calls made by the test machine are reliable data for the man responsible for the maintenance of the dial system. From these data, corrective measures can be taken to obtain the quality of service of the system within acceptable or desirable limits.

•

Q. Is there such a thing as cable breathing, and if so, what can be done to prevent its causing trouble?

A. There certainly is such a thing as cable breathing and the only method we know of to prevent it is to pressurize. Cable breathing is a phenomenon caused by temperature changes in non-pressurized cables. Air inside these cables expands with rising temperatures, therefore, building up a slight pressure. This pressure forces air out through any sheath break.

Conversely, with declining temperatures, air in the cable contracts and draws additional air in through sheath breaks. A cable suddenly cooled, such as after a summer rainfall, can draw air in so rapidly through a sheath break that it can suck moisture along with it from the wet surface of the cable sheath.

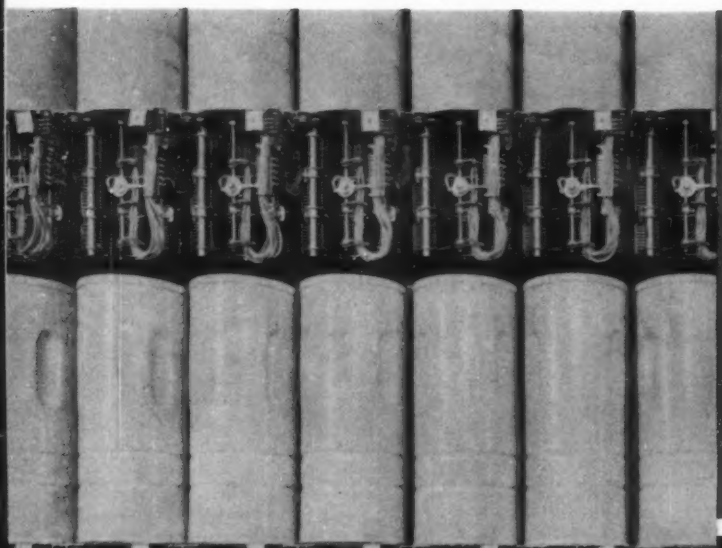
•

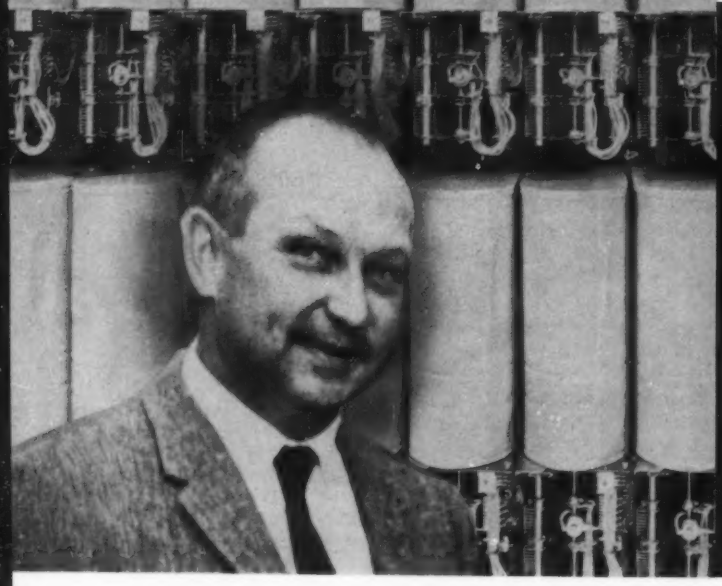
Q. We have heard of a small, lightweight spinner designed for use on small cables. Can you furnish information on this device and how it may be used?

A. We believe that you have reference to the Model "S" type spinner that weighs only 14 pounds and is designed for spinning small cables from drop cord size to approximately 1 inch in diameter. This spinner uses .045 or .061 wire and spins a 12-inch spiral with correct tension. It receives its spinning action from the lashing wire as it pays it out. You can obtain this spinner from your telephone supplier.

in the south

TELEPHONE MEN CHOOSE STROWGER!





RAY WEBB
(group manager, Central Telephone Company) is pleased with the operation of Strowger equipment at the Mocksville, North Carolina, exchange. This is just one of the many dial exchanges in the South served by Strowger. See full list at right.

SOUTHERN DIAL EXCHANGES SERVED BY STROWGER:

ALABAMA
Elba
Jemison
Nauvoo
Phil Campbell
Rockford
Tallassee

ARKANSAS
Augusta
Bay
Black Oak
Booneville
Bradford
Carlisle
De Witt
England
Holly Grove
Imboden
Jacksonville
Kensett
Marmaduke
Prescott
Stuttgart

FLORIDA
Arcadia
Auburndale
Bonita Springs
Bowling Green
Bradenton
Clearwater
Crawfordville
Crestview
De Funiak Springs
Destin
Fort Meyers
Fort Walton
Freeport
Indiantown
Lakeland
Lake Wales
Monticello
Naples
Ocala
Panacea
Ponce De Leon
Saint Marks
Shalimar
Sopchoppy
Tallahassee
Tampa
Valparaiso
Winter Haven

GEORGIA
Abbeville
Bluffton
Buena Vista
Carnesville
Chickamauga
Clayton
Coleman
Dawson
Ellaville
Folkston
Fort Gaines
Iron City
Lavonia
Lexington
Lincolnton
Ludowici
Milledgeville
Monroe
Morgan
Nashville
Ocilla
Parrott
Plains
Preston
Rincon
Sasser
Shellman
Sylvannia
Toccoa
Vienna
Weston
Winterville

KENTUCKY
Ashland
Caneyville
Cecelia
Columbia
Elizabethtown
Flemingsburg
Glasgow
Greensburg
Greenup
Hodgenville
Lexington
Nicholasville
Oakland
Tompkinsville
Versailles

LOUISIANA
Breaux Bridge
Cankton
Chataignier
De Quincy
Grand Isle
Lacassine
Leeville
Roanoke
Springhill
Thornwell
Ville Platte
Vivian

MISSISSIPPI
Fulton

N. CAROLINA
Ahoskie
Albemarle
Asheboro
Atlantic
Aulander
Aurora
Ayden
Badin
Bailey
Bath
Bayboro
Beaufort
Belhaven
Benson
Bethel
Beulaville
Biscoe
Bladenboro
Bryson City
Butner
Candor
Chadbourn
Chapel Hill
China Grove
Clarkton
Clayton
Clinton
Coinjock
Colerain
Columbia
Concord
Conway
Creedmoor
Danbury
Dobson
Draper
Dunn
Durham
Edenton
Elizabeth City
Elizabethtown
Ellerbe
Elm City
Enfield
Engelhard
Faison
Farmville
Fayetteville
Fountain
Four Oaks
Franklinton
Fremont
Garland
Gatesville
Granite Falls
Greenville
Grifton
Halifax
Hamilton
Harrisburg
Havelock
Henderson
Hertford
Hickory
Highlands
Hildebran
High Point
Holly Ridge
Jackson
Jacksonville
Kannapolis
Kenansville
Kenly
Kernersville
Kill Devil Hills
Kinston
La Grange
Lake Waccamaw
Leaksville
Lewiston
Lexington
Lilesville
Lillington
Littleton
Louisburg
Lucama
Madison
Marion
Marshall
Marshallburg
Mars Hill
Maysville
Mocksville
Morehead City
Moss Hill
Mount Airy
Moyock
Mt. Gilead
Mt. Pleasant
Murfreesboro
Nashville
New Bern
New London
Newport
Newton Grove
Norlina
Oakboro
Ocracoke
Oriental
Oxford
Pilot Mountain
Pinehurst
Pinetops
Pink Hill
Pittsboro
Plymouth
Princeton
Raeford
Ramseur
Randleman
Red Springs
Rich Square
Richlands
Roanoke Rapids
Robersonville
Rocky Mount
Roseboro
Rose Hill
Roxobel
Saluda
Scotland Neck
Seaboard
Seagrove
Smithfield
Snead's Ferry
Snow Hill
Southern Pines
Southmont
Spring Hope
Stantensburg
Stoneville
St. Pauls
Sunbury
Swan Quarter
Swansboro
Tabor City
Tarboro
Thomasville
Topsail Island
Trenton
Troy
Valdese
Vanceboro
Wake Forest
Walkertown
Wallace
Walnut Cove
Warrenton
Warsaw
Washington
Weaverville
Weldon
West End
West Jefferson
Whitakers
Whiteville
Williamston
Wilson
Winsdor
Winton
Woodland

S. CAROLINA
Abbeville
Bishopville
Bluffton
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Cameron
Chester
Conway
Fort Mill
Great Falls
Greenwood
Hampton
Jackson
Kershaw
Kingstree
Lake City
Lamar
Lancaster
Laurens
Manning
McCormick
Myrtle Beach
Olanta
Rock Hill
Shaw Field
Shawview Heights
Summerton
Sumter
Swansea
Wagener
Walterboro
Winnsboro
Woodruff

TENNESSEE
Bluff City
Bristol
Doyle
Dresden
Elizabethton
Erwin
Greenville
Jonesboro
Martin
McMinnville
Millington
Monterey
Mountain City
Petros
Powell Station
Rutledge
Sparta
Sunbright
Unionville
Wartburg

VIRGINIA
Alberta
Altavista
Bachelors Hall
Barnesville
Bassett
Baywood
Bland
Bluefield
Boone Mill
Boydton
Boykins
Bridgewater
Brodnax
Broadway
Brookneal
Buena Vista
Burkeville
Capron
Charlottesville
Chase City
Claremont
Clarkesville
Clifton Forge
Collinsville
Colonial Beach
Courtland
Covington
Crewe
Crozet
Dayton
Deltaville
Dillwyn
Edom
Elkton
Emporia
Ferrum
Fieldale
Franklin
Front Royal
Galax
Great Bridges
Gretna
Grottoes
Grundy
Halifax
Harrisonburg
Heathsville
Hinton
Holland
Hurt
Independence
Ivanhoe
Ivor
Jarratt
Keezletown
Kenbridge
Keyesville
La Crosse
Lawrenceville
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Max Meadows
Montrosa
Mouth of Wilson
McGaheysville
Natural Bridge
Palmyra
Pamplin
Pocahontas
Potts Creek
Princess Anne
Reedville
Renan
Richland
Rocky Mount
Saltville
Saluda
Scottsville
Shenandoah
Smithfield
South Boston
South Hill
Standardsville
Stone Creek
Stuart
Tazewell
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Wakefield
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WEST VIRGINIA
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Princeton
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SOUTHERN TELEPHONE MEN are pretty much like telephone men across the nation—they insist on the best in dial switching equipment. That's why so many Independent telephone men choose Strowger! The number of Independent stations served by Strowger far exceeds those served by all other makes of dial switching equipment *combined!*

NORTH, SOUTH, EAST or WEST, Strowger is best! You can prove this for yourself. Just visit a Strowger exchange and ask the owners if they're satisfied with their dial equipment. Then, get in touch with us. We'll be glad to help you plan for your next dial conversion. Just write Automatic Electric Sales Corporation, Northlake, Illinois, or call Fillmore 5-7111.

AUTOMATIC ELECTRIC GENERAL SYSTEM
Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

News on New Products

TRANSISTORIZED MULTIFREQUENCY PULSING EQUIPMENT—The General Telephone Laboratories, Northlake, Ill., has developed transistorized multifrequency pulsing equipment to provide a rapid means of key pulsing, via tone signals, from one telephone exchange to another over toll and long distance trunks.

The new equipment's use is normally confined to traffic terminating at common-control type exchanges. It is said to be particularly advantageous when used in conjunction with Direct Distance Dialing facilities, as the equipment is capable of handling DDD extra-long exchange numbers with speed and accuracy.

Rather than dialing a train of pulses, the operator merely pushes digit buttons to send the required pulses. A combination of two out of six different tone frequencies makes up a pulse.

According to the laboratories, the multifrequency pulsing gear will operate twice as fast as dial pulsing. As a result, the trunk time will be saved, which decreases the connecting time and increases percentage of revenue time for a trunk. The new equipment also reduces the chance of operator errors due to built-in correction features.

The equipment can be used with either composite or single frequency signaling for line seizure, release, and supervision signals.

Since transistors are used, less maintenance is required than in a vacuum tube-operated system, and the equipment will operate on a regular 48V exchange battery.

The pulsing equipment is made up of four separate units, as follows:

(1) *The multifrequency pulsing current supply unit* which contains two units, in duplicate, used to insure continuous operation in case of failure of one unit. Normally, one unit supplies the odd circuits and the other the even circuits.

(2) *Alarm and test circuit* housing meter-relays which continually test for tone failure. The unit features alarm lamps, test jacks, and an alarm buzzer with an alarm cutoff.

(3) *Tone transfer circuit* which responds to the alarm unit to transfer the entire load of traffic to one current supply unit.

(4) And the *resistance distribution circuit*, a terminal strip constructed similarly to a standard telephone terminal block, including resistors. It is designed to prevent over-loading of an oscillator unit when pulses are sent to a defective line.

The apparatus, which mounts on a standard 19-inch relay rack, is compatible with Western Electric Co. equipment. Request NP1244.

•

HYDRAULIC DERRICK—Rectangular side legs and an extra-long middle leg hydraulic cylinder are two features of the new Series 3750 hydraulic derrick manufactured by Holan Corp.

The Holan 3750 is described as being engineered to withstand abuse in the field. The rectangular side legs, fabricated from high tensile steel, are stronger than the tubular side legs used on the Series 3700—an earlier Holan model reported to have an enviable record for service in the field. A sturdy cross support between the derrick legs adds strength and rigidity.

A longer middle leg hydraulic cylinder allows the derrick head to come closer to the ground for forcing the digger deeper into the soil than was possible with the Series 3700. The integral middle leg with live boom action is claimed to provide extra power for butt-pulling, body loading transformers, cable reels or other equipment weighing as much as 5,000 pounds, and for forcing diggers into hard-frozen, rocky soil. Proof-of-strength, the company says, is its ability to remove an auger filled with dirt.

Holan specification data rates the 3750 as a 12,000-pound capacity derrick, capable of setting poles 75 feet in length. But they report it has actually been tested at 22,000 pounds.

One man can raise the derrick in 35 seconds and stow it in position in 40 seconds, according to Holan. A sensitive hydraulic system with a pump driven by power take-off controls every movement of the 3750.

The 3750 has a working range of 195 degrees. It swings from its over-the-cab storage position to within 5 feet of the ground for easy threading of the winch line, the company reports. Request NP1245.

•

AUTOMATIC OILER KIT—The S & G Mfg. Corp. announces it can now supply an automatic oiler for small air

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP1244_____; NP1245_____; NP1246_____; NP1247_____;
NP1248_____; NP1249_____; NP1250_____; NP1251_____;
NP1252_____; NP1253_____; NP1254_____; NP1255_____;
NP1256_____.

Name.....

Company.....

Street.....

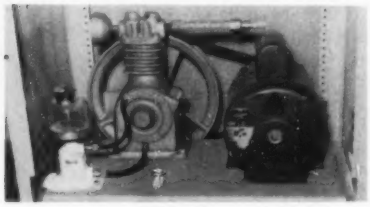
Town and State.....

1/9/60

compressors used on air dryers and dehydrators.

This automatic oiler comes in kit form with directions for installing on small-size air compressors.

Extensive tests have shown the unit to be dependable and capable of avoiding many air compressor failures due to low-level or no oil in the base, the company says.



With this new automatic oiler, inspection time can be saved, it is explained, as the oil level in the compressor base can be determined by sight, without stopping the compressor, and the air compressor will be safe from throwing rods or burning up. The oil reservoir is visible and the level can also be seen at all times.

S & G's Automatic Oiler is said to fit any Quincy X-2 Air Compressor, either tank-mounted or cabinet-mounted. It also fits the Model "R" and "RC" S & G dehydrators and other air dryers with X-2 compressors. Request NP1246.

•

REVOLVING AERIAL LADDER—A new unit, designated the Series HLE revolving aerial ladder, has been added to the line of aerial equipment manufactured by the Powers-American Division of McCabe-Powers Body Co.

Brooke Daly, company vice president, stated that the new ladder is designed to save time on overhead work by reaching jobs quickly, easily and safely.

"The HLE provides ease and safety of operation which inspires the worker's confidence," he added, "enabling him to work comfortably and therefore accomplish more work each day."

According to Mr. Daly, the ladder's simplified design reduces initial cost, installation expense and upkeep to a point that fits the limitations of any operating budget.

Elevation of the Series HLE is actuated, the company says, by a hydraulic cylinder which is powered by an electric motor-driven pump. The motor, operated by the truck battery, is designed to work with a 6 or 12-volt chassis electric system and use of the motor has no appreciable effect on the life of the battery.

Hydraulic elevation of the ladder by means of an electric motor is claimed to eliminate the cost and installation of a power take-off normally required when hydraulic power is utilized on ladder equipment. A control switch can be furnished to permit operation of the ladder from the working platform.

The HLE is lowered by gravity. A manually-operated check valve is said to regulate release of oil from the hydraulic cylinder, aiding in positioning of the ladder and controlling speed of descent. A handwheel, which operates a worm and ring gear mechanism, rotates the ladder 360 degrees in either direction. Ladder is automatically locked in the position to which it is turned.

Extension of the upper ladder is manually controlled by a handwheel and twin roller chain assembly. The upper ladder rides on rubber-covered rollers and is locked, the company says, in desired position of extension by aluminum-bronze hooks which engage rungs on the lower ladder.

It was announced that the new ladder would be offered in four sizes. Based on installation on a body having ground-to-body floor height of approximately 30 inches, the ground-to-working platform heights of the four sizes available are 27 feet, 31 feet, 35 feet and 40 feet.

The ladder can be installed, McCabe-Powers reports, on standard or custom-made bodies in its Powers-American line or by the purchaser on a body in use. Request NP1247.

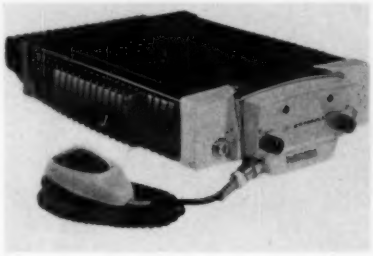
•

TWO-WAY MOBILE RADIO — Motorola announces it is expanding its line of Motrac two-way radios, the extensively transistorized mobile units first introduced in 1958.

The expanded line will provide the highest powered transistorized equipment available, the company states. It will accommodate either positive or negative vehicular battery ground polarity and will have models for operation from either 6 or 12-volt sources.

The new line is to consist of 25-watt and 50-watt models for the low band (25-54 mc) frequencies, and 30-watt, 60-watt, and 80-watt models for the high band (144-174 mc) frequencies.

Motorola states that low operating costs and highest reliability are provided in the new line, and that this is accomplished through use of transistors



in all receiver and power supply circuits and in two transmitter circuits. The advantages of concepts and techniques used in the Motrac radio have been verified in scores of radio-using industries, according to the company.

High quality circuit boards, modules, and die cast construction are also employed throughout the Motrac radio to further reliability, compactness and ruggedness, Motorola points out.

Contributing to lower operating costs are the units' low power consumption characteristics. Even the new 80-watt unit will draw no more than .5 amp plus intermittent crystal heater drain while on standby—a minute percentage of that consumed by high-powered tube units, the company says.

Low battery drain, as another advantage, enables use of the radio when the vehicle is parked, without idling the engine to keep the battery charged, Motorola states. This results in less gasoline consumed, less engine wear, and other cost savings.

According to the company, reliability is attained through the long-life characteristics of the transistors which are solid state devices with no moving parts. Transistors have replaced the vibrators and dynamotors in the Motrac radio's power supply. Transistors also have replaced all tubes in the receiver, and a transistor is used instead of a tube in the transmitter's audio amplifier stage.

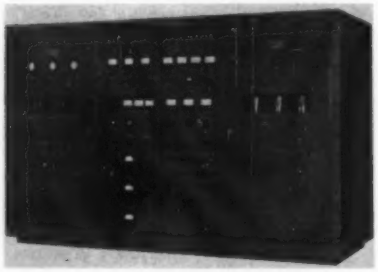
Motorola states it automatically reduces its maintenance agreement rates

for users of Motrac radio by at least 10 per cent compared to rates on vibrator or dynamotor-powered models.

The new units measure 3 inches high, 13 inches wide and 17 inches long—one-half the bulk of conventional tube type equipment, Motorola points out. Housings for the new and the old Motrac radios are interchangeable. Request NP1248.

•

KLYSTRON POWER AMPLIFIERS—Two new klystron power amplifiers, designed for both industrial and military applications, have been developed by Sierra Electronic Corp., a division of Philco Corp.



One of the amplifiers, Model 216A, has a power output of 10 kilowatts, while the Model 217A is a 1-kilowatt unit. The amplifiers, which are described as employing four-cavity, water-cooled klystron tubes, are particularly useful in scatter communication systems, high power point-to-point data transmission systems and space programs.

Both units can be continuously tuned over the frequency range of 1700 to 2400 megacycles. When operated as broadband amplifiers, they provide a minimum gain exceeding 40 db, the company says.

The 1-kilowatt amplifier, self-contained in one cabinet, has a maximum frequency bandwidth of 15 megacycles at the ½ power points. The unit's outside dimensions are 84 inches high, 44½ inches wide and 42 inches deep.

With the exception of its heat exchanger, the 10-kilowatt amplifier is completely contained in three connected cabinets. Its frequency bandwidth is 18 megacycles at the ½ power points.

Operating controls on both amplifiers are said to be arranged for maximum convenience and efficiency. Request NP1249.

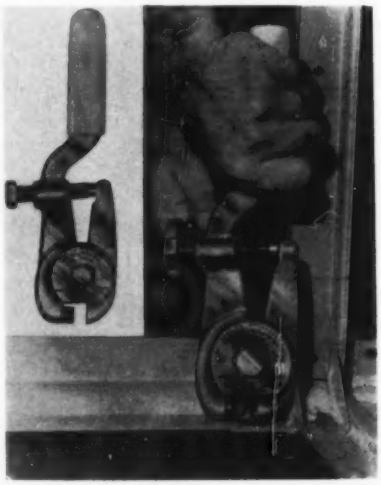
•

SWIVEL JAW NUT SPLITTER—Stubborn "frozen" and rusty nuts can now be reached, split, and removed easily and quickly with the new HKP Swivel Jaw Nut Splitter introduced by H. K. Porter, Inc., the company reports. The nut splitter is designed to cut nuts up to, and including, ⅞ inch across flats.

To operate, the swivel blade is placed against the side of the nut, the power screw is turned by hand until the jaw is tight against the nut, and then tightened with a hand or power wrench until enough pressure is applied to split the nut. The tool will not damage the bolt from which the nut is removed, the company states, and the whole procedure takes only a few second's time.

Made of what Porter says is the finest steel, the new swivel jaw nut splitter has many outstanding features. The swivel blade, which is made of tempered tool steel, can be turned with the fingertips to cut at any angle, in any position, even in tight quarters.

The jaw, handle, jaw pivot bolt, and power screw are all made of heat-treated alloy steel, with the jaws and handle drop-forged as well, to give them exceptional strength, the company reports.



The tip of the power screw is hardened and tempered to prevent "mushrooming" under the pressure needed to split the nuts.

Hand grips are of plastic, for comfort and no slipping. Request NP1250.

•

EXTRA TOUGH GLASS INSULATOR—A new, extra tough glass insulator, designed to reduce maintenance and costly interruptions in service on all communications lines, has been introduced by the Kimble Glass Co., a subsidiary of Owens-Illinois. This insulator has a double petticoat and is known as Hemingray 45-T.

Kimble reports the glass in this rugged insulator is tempered to provide resistance to pellet and rifle damage and thermal shock. The company recommends it for use in areas where circumstances or conditions require a dependable, heavy-duty insulator.

Specifications of the 45-T conform with all specifications established for communications insulators.

Because of its tough glass surface "skin" it can be tightened more securely to the arm pin without fear of breakage, according to Kimble. Its resistance to torque and transverse pull means that the pin would shear off before the insulator could break, the company states.

Insulator trouble locations in the field can be spotted quickly with this insulator, because, if broken by causes beyond normal use, the insulator disintegrates into small, non-sharp fragments. It cannot crack nor be punctured, according to the company. Request NP1251.

•

WOOD BIT—The Irwin Auger Bit Co. has announced that it has developed a special 415T Pole-Bor wood bit designed to bore through creosoted poles without clogging, binding or stopping to clear chips.

The bit has an adapter shank and medium pitch screw enabling it to fit both hand braces and electric drills. It is described as coming with a conventional taper square shank for use in hand braces, which when cut off, can be used in both hand braces and electric drills. This, the company says, cuts inventory costs.

Features of the bit are listed by the company as follows:

Newly designed cutting head, twist angle and smooth polished hollows which assure a continuous flow of chips.

Spur on head which outlines hole ahead of cutting edge. Side lip then smooths side of hole, making it easy to insert bolts or pins in pole.

Head and twist ground to proper clearance for easy removal from the hole.

Six precision-ground "flats" that chuck perfectly in electric drills. No wobble, no run-out.

The bit comes in 12 sizes—6/16-inch to 17/16-inch. It is reported to give faster boring action in telephone and power poles, but is said to be equally efficient for boring large timbers used in heavy construction.

Its overall length is approximately 18 inches with 12-inch twist and 6-inch shank. Request NP1252.

•

ULTRA-HIGH CAPACITY DYNAMOMETER—Two new capacities, 150,000 and 200,000 pounds, have been added to the W. C. Dillon & Co., Inc.'s line of direct-reading, traction-type dynamometers (portable force-measuring instruments). Fifteen capacities from 0-500 pounds up to 0-200,000 pounds are now available.

Both new dynamometer units have a

What major contractors say about CABLEGARD™

"... lowers installation costs..."

"We wish to express our satisfaction with Cablegard. It not only lowers installation costs, but greatly increases the physical security of buried telephone plants. We first began using Cablegard a year ago, and have installed it on all our underground telephone jobs since then. We are continuing to find new uses for this product, and feel quite sure that in the near future it will have universal application."

FRANK HORTON, PRESIDENT
FRANK HORTON & COMPANY, LAMAR, MISSOURI

"... far easier (than pipe) to install..."

"Your Cablegard has proven far easier to install, compared with pipe, for culvert and bridge crossings. We like the idea of eliminating splices and extra pedestals formerly needed for this purpose. Past practice sometimes called for burying cable in the riverbed or running piping on the bottom—which was risky, for ice and floods could ruin such an installation. Cablegard, securely fastened to bridge beams, makes a safe, practical, good-looking job. We highly recommend your product to owners and engineers."

R. J. MULLEN, PRESIDENT
MULLEN CONSTRUCTION CO., INC., APPLETON, WISCONSIN

EXCLUSIVE...

Butler Cablegard gives the protection of solid-wall pipe or conduit, above or underground. Installs in minutes, with no special skills needed. It's flanged to clamp *around* cable, avoids cost of cutting and splicing. Approved by R. E. A. (see REA Bulletin 344-2) Cablegard will put your plant construction program miles and dollars ahead!

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net weight of 23 pounds, independent of shackles, pins and shunt bar, and have 10-inch diameter dials. The company states all parts of its dynamometers are made to withstand rough usage. The case is heavy metal; dial is 22-gauge brass, protected by a ¼-inch thick plastic crystal. These instruments are designed to withstand roughest weather for field work, as well as the strain of heavy industrial applications.

All Dillon dynamometers incorporate the following features, the company states: a resetable red maximum hand which "remembers" point of peak load; removable clevises of drop-forged alloy steel; an ultra-sensitive mechanism that produces a full-scale reading with only a .040-inch deflection of the special alloy steel beam, regardless of capacity; a fatigue-tested beam which retains its resiliency indefinitely without creep or hysteresis; and overload protection built into the beam, which sustains appreciable surges without damage to calibration. Each unit is individually calibrated to an accuracy of 2 per cent plus or minus full range. The units also measure torque, traction, tension, compression or weight. Request NP1253.

•

REEL CARRIER—Truck Equipment Co. announces the production of a new modified reel carrier which accommodates reels up to 62 inches in width.

A newly designed axle, wheel and hub assembly enables this standard Truco trailer to accept the larger reels. The 8-inch increase in inside width permits the Model TCR to accept the wider reels now being produced by cable and conductor manufacturers at no increase in cost.

The Truco modified trailer will handle reels of 96-inch diameter and up to 14,000 pounds. Also available on special order are trailers to handle reels up to 108-inch diameter, 72 inches wide with a 20,000-pound capacity. These feature the Truco hydraulic system driven by a separate power source.

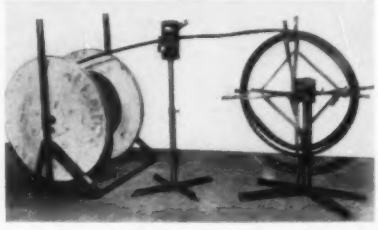
As an optional accessory, Truco can supply payout tensioning and power pulling equipment to any of these trailers for the stringing of cable and conductor under tension. Request NP-1254.

•

CABLE MEASURING SYSTEM—Hykon Mfg. Co. is introducing a new cable measuring system which, it says, has improved accuracy and wide range.

The Hykon cable measuring system consists of (1) a reelift, (2) meter, (3) mounting stand, and (4) collapsible take-up reel. The meter handles up to 2-inch diameter cable or similar materials and has a wire-guide adapter for measuring small wire. A direct-drive Veeder-Root counter is calibrated in feet and inches, providing better accuracy and visibility, the company states. Proper spring-loaded tension is maintained to prevent cable slippage during measurement.

One important feature of the system, Hykon points out, is the heavy duty reel, built of rigid welded steel tubing and structural forms. It collapses instantly and has a quick-release handle with a positive lock. Cable coils are easily removed from the coil-support brackets.

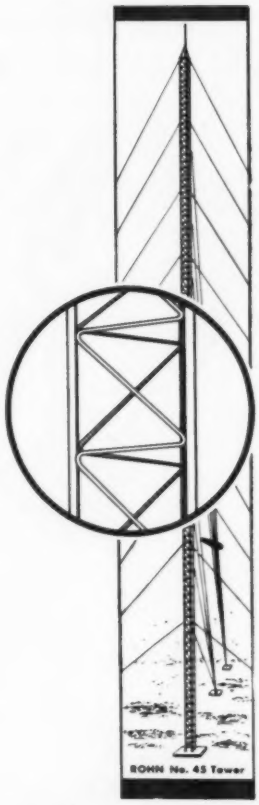


The meter stand can be adjusted from 30 inches to 48 inches in height. The complete system of reelift, meter, stand and take-up reel is available, or each item may be obtained as a separate unit. Request NP1255.

•

COMMUNICATIONS TOWER—A new heavy-duty communications tower is now being marketed by the Rohn Mfg. Co.

This Rohn tower, called the No. 45, is suitable for heights up to 450 feet when guyed every 50 feet under normal conditions, the company reports. Constructed in 18-inch triangular pattern utilizing zig-zag steel bracing, the tower is all electrically welded. The entire 10-foot tower section is hot-dipped galvanized after fabrication.



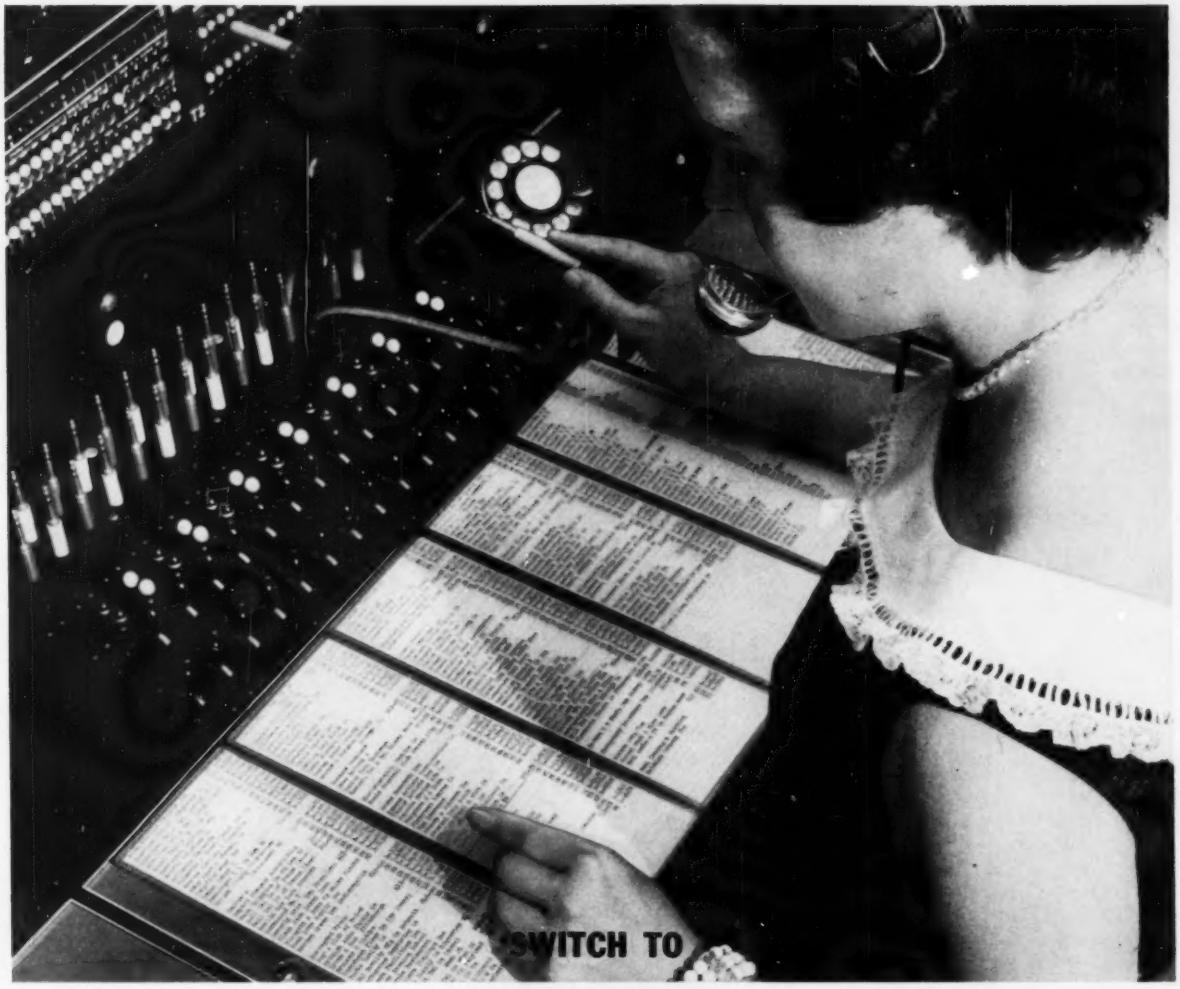
The company announces that the No. 45 tower sections will be interchangeable with the Rohn No. 40 tower, even though the Rohn No. 40 tower section utilizes a different pattern of cross bracing. Request NP1256.

Economic Dilemma

"Why is it that some business leaders join taxpayers' organizations to bring pressure on the government to cut expenses, yet support industry groups seeking more government subsidies? Why is it that some labor leaders press hard for wage increases to keep up with the cost of living, and then urge a massive program of legislative action which, if adopted, would lead to more deficit spending, higher taxes and inflation—all of which could only demoralize the value of wages earned?"—MAURICE STANS, *director, Bureau of the Budget.*

Designed for Work

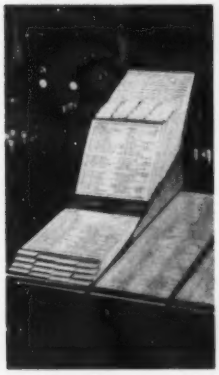
"Man hath his daily work of body or mind appointed, which declares his dignity; while other animals unactive range, and of their doings God takes no account."—MILTON.



FASTER PBX SERVICE

ACME UNDER GLASS FLEXOLINE Panels and Multi-Card Bulletins speed reference to key numbers and long distance routings. Frequently called information stays right under the operator's eye on Flexoline Panels that slip beneath the plexiglass. Change any line just by typing a new Acme Visible Flexoline strip and snapping it into the proper place on the Panel. ■ Keep other key numbers, routes and rates at operator's finger-tips in an Acme Visible Multi-Card Holder, with hinged clear-view acetate pockets and large, durable index tabs. Any capacity. SEND COUPON FOR FACTS.

Multi-Card Bulletin Holders keep up to 4000 or more listings at operator's finger-tips.



Each Flexoline panel can be independently removed without removing plexiglass.

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COMPANY_____

ADDRESS_____ CITY_____ STATE_____

Courts and Commissions

Shift N. J. Jurisdiction in Refusal to Yield Line

In the case of the two New Jersey women who refused to yield a party line to a physician who wished to call an ambulance for an elderly heart patient, Magistrate Milton Freiman of Millburn on Dec. 30 ruled that he had no jurisdiction in the case of Mrs. Jeannette Hausler, who resides in Springfield, N. J.

Magistrate Freiman had previously (TELEPHONY, Dec. 26) found Mrs. Mary Zelinski of Millburn guilty of the charge of violating the disorderly persons act by refusing to yield the telephone in an emergency, and fined her $200. At that time, he had withheld a verdict in the case of Mrs. Hausler, pending study of a motion challenging his jurisdiction.

Mrs. Zelinski is appealing the decision against her to the Essex County (N. J.) Court.

The magistrate, in the latest action, said that only the Springfield (N. J.) Municipal Court had jurisdiction over Mrs. Hausler's alleged refusal to hang up the telephone. Since this is a violation of the disorderly persons statute, such charges, he said, could be made only in the municipality where the offense was committed.

Mrs. Catherine Hammerle of Millburn, daughter of the elderly woman heart patient, Mrs. Sophie Wetzel, had to telephone for the ambulance from a neighbor's home. She entered the complaint against the two women, and has said she would make a new complaint against Mrs. Hausler, as "I want to see justice done in this case."

Mrs. Hammerle shares a telephone party line with Mrs. Zelinski. During the emergency of her mother's heart attack, Doctor Marvin Becker said that there was a delay of eight to 18 minutes in calling an ambulance because Mrs. Zelinski and Mrs. Hausler would not give up the telephone. He further testified that he was told to "go to hell" by one of the women when he requested that they yield the line.

•

The latest count of states having laws pertaining to emergency party line usage is 26. According to the latest information we have, these states are: Arizona, Arkansas, California, Idaho, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire and New Jersey.

Also, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Tennessee, Virginia, Vermont, Washington and Wisconsin.

To Hear Railroads' Appeal On N. C. Interconnections

The North Carolina Utilities Commission has announced that it will reopen for further hearing on Mar. 8 a case in which it ruled on Nov. 23 that railroads have no right to interconnect their communications systems with those of telephone companies, except in case of emergency (TELEPHONY, Jan. 2).

The Southern Railroad had notified the commission it would appeal the order to the courts if it was not granted a rehearing, and Seaboard Air Line Railroad also had asked that it be given a chance to present testimony.

In its order, the commission split 3 to 2 on the decision that Southern Bell Telephone & Telegraph Co. should not be required to provide interconnections for Southern Railway's private telephone system, except in case of emergencies.

Southern Railway for many years had an agreement which provided for such interconnections with the Southern Bell system; and Bell, seeking to cut down on the operation, filed a new tariff last summer which would have allowed interconnections on wire lines and on circuits, not over 50 per cent of which had been converted to microwave operation, but which would have ruled out interconnections on all microwave circuits except in cases of emergency.

The commission went even further than Southern Bell, and ordered all interconnections discontinued except in emergencies.

Michigan Telephone Tax

The Michigan legislature has enacted a tax program which includes a 3 per cent tax on telephone and telegraph services.

Conditional Increase Is Authorized in Arkansas

The Arkansas Public Service Commission on Dec. 29 authorized the E. Ritter Telephone Co., Marked Tree, to raise its rates by $30,475.20, which includes the exchanges of Lepanto, Tyronza, Keiser and Midway (TELEPHONY, Dec. 19).

The commission also said that the company "must stand ready" to refund any amount found to be in excess of a reasonable return if "further investigation" shows that there was an excess at Tyronza and Lepanto.

General of SW Granted Raise at Tex. Exchange

The General Telephone Co. of the Southwest has been granted a two-step rate increase at Groveton, Tex. as follows:

	Old	*Eff. Jan. 1*	*Eff. July 1*
Business:			
One-party	$4.50	$6.50	$8.50
Two-party	3.50	5.50	7.50
Residence:			
One-party	2.75	3.75	4.25
Two-party	2.25	3.00	3.50

N. M. Court Rules Electric Co-op Not Under Commission

New Mexico's Supreme Court has held that a rural electric cooperative cannot be considered a public utility under the state's law, and therefore, does not fall under the jurisdiction of the New Mexico Corporation Commission.

This decision came in the case of the Socorro Electric Cooperative, Inc., which protested the action of the commission in granting authority to Public Service Co. of New Mexico, a privately-owned public utility, to construct power lines and stations to serve a proposed cement company plant near Scholle. The co-op had told the commission it was "ready, willing and able" to supply the electricity and said the plant was in a general area already served by the co-op.

In reply, the commission said it had no jurisdiction over the co-op and could

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not grant the request even if it desired.

It held that the cooperative's protest could be entered before the commission only as evidence in deciding if the authority to serve should or should not be granted the Public Service Co.

In the supreme court opinion written by Chief Justice Eugene D. Lujan, the court ruled "The Socorro Electric Cooperative fails to meet the test of a public utility in that it does not profess to, and indeed cannot, serve the public generally."

Noting that the Socorro co-op can supply electric power only to one outsider for every 10 members, Justice Lujan said: "The rights and obligations of a cooperative differ basically from those of a public utility . . . a cooperative's statutory power to serve is strictly limited."

The Socorro co-op had originally appealed the commission ruling to the Socorro County District Court, and, losing there, had filed an appeal with the supreme court.

Announces Formation of New Iowa Company

The Appanoose County Telephone Co., Centerville, Ia., announced on Dec. 19 it is forming a new company known as the Iowa State Telephone Corp.

The reason for this change, according to Walter Hambleton, general manager, is to consolidate ownership of the exchanges at Centerville, Unionville, Udell, Plano, Iconium, Mystic, Cincinnati, Exline, Milton, Martendale, Peru, Arispe, Shannon City, Tingley, Promise City and Ellston.

The officers of this new company will remain the same as the officers of the present company, it is reported.

Mr. Hambleton also said a new $150,000 telephone general office building will be constructed and conversion of telephones will also start during 1960.

Two Rate Raise Applications Filed in Wisconsin

The Wisconsin Public Service Commission on Jan. 6 was to have heard the application of the Bruce Telephone Co., Inc., for a rate increase.

Also in Wisconsin, on Jan. 4 the commission had scheduled a hearing on the application of Novy's Telephone Co., Kendall, for a rate raise.

FCC OK's Ill. Bell Sale

The Federal Communications Commission has authorized Illinois Bell Telephone Co. to discontinue service at the Effingham exchange (TELEPHONY, Nov. 21). Illinois Consolidated Telephone Co., Mattoon, took over operations at Effingham as of Dec. 31, 1959.

Surcharge Starts Decrease In N. Y. Unlisted Numbers

The New York Telephone Co. (Bell) reported through a spokesman that its new 50-cents-monthly charge for unlisted numbers is causing a large portion of these subscribers to switch to listed numbers (TELEPHONY, June 20, 1959).

The increase became effective with publication of the 1960 directories and applies to 400,000 unlisted numbers in New York including 375,000 in New York City's metropolitan area.

Since the Brooklyn telephone directory was the first scheduled for publication, 100,000 Brooklynites were the first notified.

Twenty thousand replied. Eighteen thousand switched to listed numbers; 2,000 agreed to pay the extra charge.

The company will send out additional notices to the other 80,000 and will bill them the increase unless notified otherwise.

According to New York Telephone Co., unlisted numbers constitute a special service to a special group of subscribers. Costs entailed formerly were imposed on all subscribers but now will be paid only by those who get the special service.

Ohio Company's Rate Application Is Heard

The Shelby Telephone Co. on Dec. 16 filed a rate request with the Ohio Public Utilities Commission.

Present and requested rates for various types of service are as follows:

	Old	*New*
One-party residence	$4.35	$6.50
Five-party residence	2.75	4.50
Rural ten-party residence	2.50	3.75
One-party business	8.00	12.00
Two-party business	7.00	9.50
Rural ten-party business	5.50	9.00

The company also asked to increase its rates for private branch exchange service, for mileage charges, and secretarial service.

Missouri Independent Seeks Incorporation

The New Florence Telephone Co. filed articles of incorporation in the Missouri Secretary of State's office, it was reported on Dec. 21.

The New Florence system has been in operation since before 1900, and is serving approximately 250 subscriber-owners.

Ruth Cardwell was listed as registered agent for the company. Total number of shares the corporation will have authority to issue will be 600, all without par value.

Two Minnesota Companies Get Rate Approvals

The Minnesota Railroad & Warehouse Commission on Dec. 29 authorized the following two rate increases:

Granada Telephone Co., which plans to convert its magneto exchange to automatic operation in April, was allowed to raise rates.

It is borrowing the $52,000 needed for the conversion from a private lending agency at 6 per cent interest. The company serves 215 company-owned and 33 switch-line stations.

Under its new rates, net operating revenues will rise from $7,852 to $15,558, giving the company a net income of $3,656 and a 5.59 per cent return on its rate base of $65,355. Under old rates, the company had a deficit of $3,453.

Present rates and rates effective on conversion are as follows:

	Present	*Approved*
One-party business	$4.00	$6.50
Two-party business	—	5.75
Multi-party rural business	—	5.50
One-party residence	3.00	5.00
Two-party residence	2.50	4.50
Four-party residence	2.00	3.75
Multi-party rural residence	2.50	4.50

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In the other rate approval, Union Telephone Co., Osage, was authorized to raise rates to enable the company to hire an additional operator to provide 24-hour service. The company also plans to do additional line maintenance.

The Union company serves 166 stations.

With its new rates, the company's net operating revenues will increase from $6,025 to $8,678. This will provide a net income of $612 and a 5.05 per cent rate of return on the rate base of $12,102. The company formerly had a deficit of $1,731.

Old and new rates are as follows:

	Old	*New*
One-party business	$2.00	$4.50
Two-party business	2.00	4.00
Multi-party business	—	4.00
One-party residence	1.50	3.50
Multi-party rural residence	1.50	3.00

Reject S. D. Telephone Tax

South Dakota's Citizens Tax Study Committee has rejected a proposal that the state pick up the federal excise tax on telephones if the federal levy is dropped. The committee, created by the governor, is studying new and revised state revenue sources.

Chairman Doerfer Reports On FCC's First 25 Years

JOHN C. DOERFER, chairman of the Federal Communications Commission, in issuing his year-end report for 1959, the commission's 25th year of operation, stated that with 570,000 radio station licensees using well over 1,700,000 transmitters requiring 1,900,000 authorizations for operators to man them, not to mention constantly expanding wire and cable telephone and telegraph services, the Federal Communications Commission faces 1960's promise of more telecommunications developments and their attendant problems. These will add to an unprecedented administrative and regulatory burden.

Broadcasting, because of its more intimate nature, Chairman Doerfer said, commands the lion's share of popular interest. However, equally important considerations are posed by the growing pains of more than 50 categories of other radio services, whose transmitters outnumber those used for broadcast by 165 to 1.

Communication services essential to the protection of life and property, as well as those used by business and individuals, present increasing questions which become more complicated and have more impact with each passing year.

Services and problems, as they relate to the telephone industry, were presented by Mr. Doerfer under the following classifications and headings.

"*Safety and Special Radio Services*— An excess of 550,000 authorizations covers the use of over 1,700,000 fixed, mobile and portable transmitters. This is a corresponding increase of about 85,000 stations and 300,000 transmitters for the year.

"More than 40 categories of users provide communication on the land, on the water and in the air in the interest of safety of life and property and to serve commercial and individual needs."

Marine transmitters increased from 80,000 in 1958 to 95,000 in 1959.

Aviation transmitters numbered 85,000 in 1958, but grew to 125,000 in 1959.

Land transportation transmitters, facilitating communication, grew from 345,000 in 1958 to 445,000 in 1959.

Last year, American industry employed 538,000 transmitters in its operations, as compared with 420,000 in the previous year.

Aiding public safety, there were 332,000 transmitters last year as compared with 307,000 the year before.

Mr. Doerfer went on: "Four new services provide radio use by local governments; manufacturers; business establishments; and for telephone maintenance. A medical emergency radio service has been proposed.

"Amateur radio stations soared from 188,600 to nearly 203,000.

"Authorizations in the citizens radio service gained 27,800 in 1959 to total nearly 70,000.

"*Common Carrier Services — Telephone* — The United States now has nearly 71 million telephones (Bell—60,100,000 and Independents—10,800,000), which is more than the total telephones for the rest of the world.

Telephones are used to make about 266,500,000 calls daily (255,200,000 local and 11,279,000 toll), or 16,000,000 more than a year ago.

"Approximately 96 per cent of Bell System telephones and 85 per cent of Independent telephones can dial local calls, and long-distance dialing is increasing.

"At the instigation of the FCC, the Bell System reduced long distance telephone toll rates by about $50,000.000 annually (TELEPHONY, Aug. 8, 1959).

"Extension of microwave and coaxial cable facilities is further distributing TV programs, and the telephone system adds to the relay of aural network broadcast.

"Telephone communication with moving vehicles, to the inclusion of passengers in aircraft, is increasing.

"A second transatlantic telephone cable was placed in operation, between Newfoundland and France. The first one connects Newfoundland and England. There are also telephone cables from the United States to Alaska and to Hawaii; and one to Puerto Rico is being laid.

"It is now possible to call 130 other countries or areas to be connected with nearly 98 per cent of all the telephones in the world.

"*Telegraph* — The only nation-wide Telegraph service — Western Union — handled about 131,000,000 messages in 1959.

"Western Union inaugurated an intercity public facsimile service by offering it, initially, for transmitting graphic material between Washington, New York City, Chicago, St. Louis and San Francisco.

"Its business customers are using 36,000 'deskfax' (facsimile) machines to send over 40,000,000 telegrams annually between their offices and central telegraph offices. In addition, the company leases about 325 separate 'intrafax' facsimile systems.

"Western Union's microwave system, presently linking New York City, Philadelphia, Washington, Pittsburgh, Cincinnati and Chicago, is being extended to Kansas City.

"The commission has asked Western Union for a definite plan to divest its ocean cable operations, which is required by law, as a result of its merger with Postal in 1943.

"The FCC has indorsed, in principle, legislation to permit the merger of international telegraph carriers.

"*National Defense* — In cooperating with military and civil agencies doing national defense planning, the commission has appointed national and state advisory groups to assist its own phase of that program. Also, a commission unit of the National Defense Executive Reserve has been established to help the FCC in event of a national emergency.

"The commission supervises the CONELRAD system which, besides being geared for minimizing the navigational aid an attacking enemy might obtain from radio emissions, is also concerned with mobilizing the communications industry for emergency purposes.

"Incident to the CONELRAD program, its alerting system is being used to warn localities and regions of storm and other weather conditions threatening life and property.

"*Field Engineering and Monitoring*— Besides trying to cope with mounting interference and enforcement problems, the commission's 31 engineering field offices and 18 monitoring stations must police the spectrum for technical violations and illegal operations; furnish monitoring bearings for ships and

USITA Committee Changes

The United States Independent Telephone Association has announced these changes in its Engineering Committee (TELEPHONY, Jan. 2):

I. B. Jackson of General Telephone Service Corp. succeeds F. D. Reese of General Telephone Laboratories, Northlake, Ill.

Clarence Beswick of Geneva, O., joins the Subcommittee on Radio and Carrier.

through hot jungles or arctic cold or anywhere in the free world

GHO teams conquer terrain, weather and labor problems to lay cables and string lines in populated areas or desolate foreign soils . . . on schedule.

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planes in distress; examine radio operators; inspect radio stations of all kinds; and perform certain contractual work for other federal agencies. Another task, is to process applications for high antennas involving aviation safety considerations. Eighty-three TV shafts of a thousand feet or higher are now in operation. The tallest is the 1,619-foot tower at Portland, Me.; and one building at Cape Girardeau, Mo., will rise 1,676 feet to make it the world's tallest man-made structure.

"In combating interference, the commission is assisted by more than 480 groups which cooperatively resolve minor cases in their respective communities and areas. . . . To guard against interference, certain equipment is given type approval or type acceptance by the commission before it is manufactured."

Frequency Allocations—The Commission has reported on frequency allocations above 890 megacycles and is studying the data filed in its inquiry concerning allocations below that portion.

"Further, the commission and the Office of Civil and Defense Mobilization are jointly considering prospective government and civilian frequency needs as a whole.

"*International*— In the international field, important actions are expected from the 1959 Geneva conference for revising the world's radio regulations and consideration of extending the usable radio spectrum from 30,000 to 40,000 megacycles, with special provision for earth-space communication and radio astronomy needs. The commission helped to prepare the United States proposals, and two commissioners served as chairman and vice chairman, respectively, of delegations to two sessions."

General Problems—Never before has so much of the commission's time been diverted from the normal administrative process by happenings which require priority attention, particularly in litigation and legislative matters. Court actions have necessitated new and additional time-consuming procedures, and Congressional considerations have resulted in an unprecedented number of comments, personal appearances, and special studies and reports.

Mr. Doerfer continued: "To help it reduce backlogs and catch up with its growing workloads, the commission has asked Congress to:

"Eliminate a 1952 amendment to the Communications Act which the courts have interpreted as requiring the commission to hold a hearing on practically all protests (even from those not in the communications business) to grants made without hearing.

"Remove another 1952 amendment which requires that a prehearing notice be sent before an application can be designated for hearing.

"Remove certain restrictions in the act which preclude the commission from consulting its own engineering and legal staffs in adjudicatory matters.

"Permit it to make more use of its review staff.

"Correct certain omissions in the act concerning 'ex parte' presentations.

"Eliminate the present requirement of oaths on routine forms.

"Grant it authority to impose small fines to combat minor but increasing violations of its rules and regulations."

The report, in conclusion, stated: "'Tooth-and-nail' competition, which now permeates other services as well as broadcast, deluges the commission with filings and counter filings which are inordinately lengthy and often repetitious. Each petition not only requires a documented ruling by the commission but every question raised must be formally dealt with. Such paperwork impedes commission final determination and delays providing services which directly or indirectly affect the public."

Federal Interest Payment Estimate Increased $1 Billion

Interest payments in the fiscal 1960 federal budget, which were calculated at 8.1 billion dollars in January, will amount to 9.1 billion dollars, according to figures released by Tax Foundation, Inc.

This interest payment estimate, made in September, approximates as much as all federal government spending in 1940.

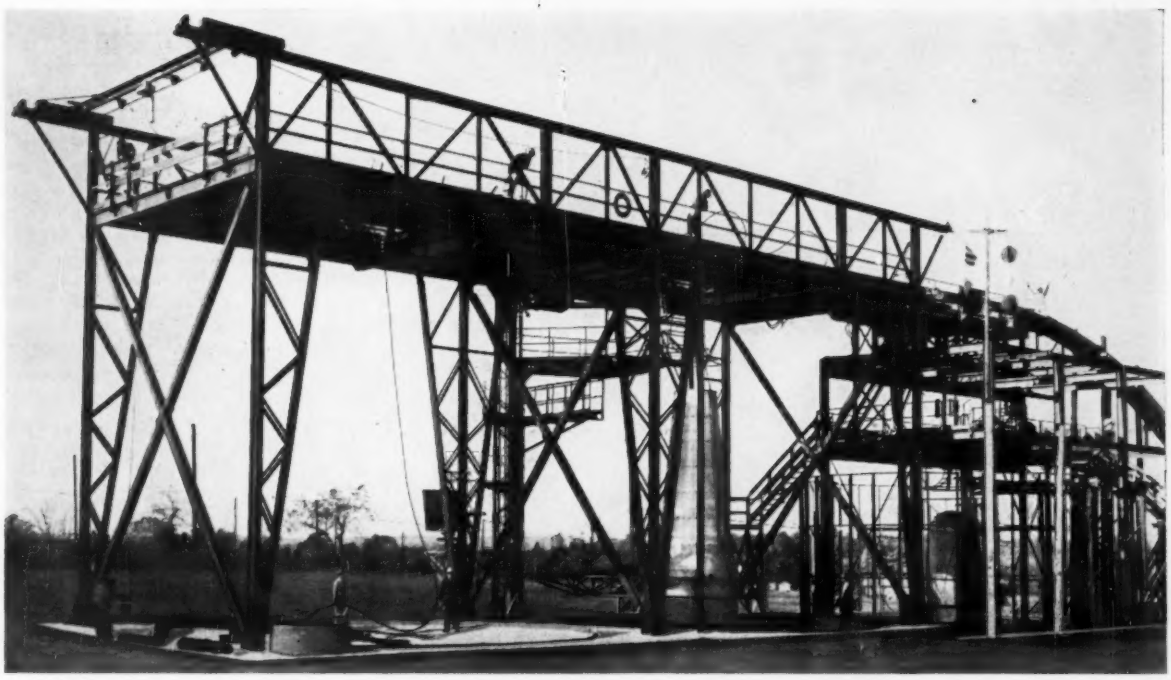
Out of the total fiscal 1960 federal budget of 78.9 billion dollars, interest payments represent 11½ per cent. In fact, next to expenditures for the Defense Department, payments for interest are the largest expenditure in the budget.

The 9.1 billion dollars figures out to $51.48 for every man, woman and child in the United States today. Four (fiscal) years ago, interest payments per capita were almost $42. Ten years ago, they were $39; 20 years ago, in 1940, they were $8 per person.

The 1960 interest figure is more than all state and local governments spent for streets and highways in 1957 (7.8 billion dollars). It is almost two-thirds of what state and local governments spent for elementary and secondary schools and other educational purposes in 1957 (14.1 billion dollars).

One Way or the Other

"Fellows who drive with one hand are usually headed for a church aisle. Some will walk down it—others will be carried."—*West Branch (Iowa) Times.*



SHIP WITHOUT AN OCEAN

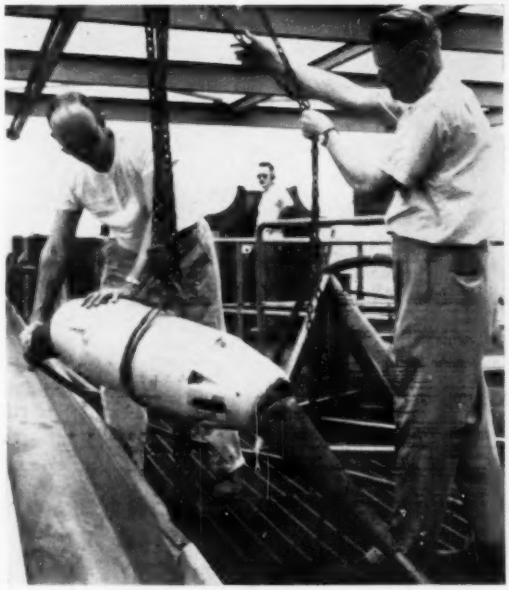
How do you lay a cable on the ocean floor—a cable that is connected to scores of large, heavy amplifiers? How do you "overboard" such a system in a continuous operation, without once halting the cable ship?

Bell Telephone Laboratories engineers must answer these questions in order to lay a new deep-sea telephone system designed to carry many more simultaneous conversations. They're experimenting on dry land because it is easier and more economical than on a ship. Ideas that couldn't even be attempted at sea are safely tested and evaluated.

In one experiment, they use a mock-up of the storage tank area of a cable ship (above). Here, they learn how amplifiers (see photo right), too rigid and heavy to be stored with the cable coils *below* decks, must be positioned *on* deck for trouble-free handling and overboarding.

Elsewhere in the Laboratories, engineers learn how best to grip the cable and control its speed, what happens as the cable with its amplifiers falls through the sea, and how fast it must be payed out to snugly fit the ocean floor. Oceanographic studies reveal the hills and valleys which will be encountered. Studies with naval architects show how the findings can be best put to work in actual cable ships.

This work is typical of the research and development effort that goes on at Bell Laboratories to bring you more and better communications services.



Experimental amplifier about to be "launched" from "cable ship." Like a giant string of beads, amplifiers and connecting cable must be overboarded without stopping the ship.

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ASK YOUR SUPPLIER — or write us for the complete PORTER PRUNER catalog.

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Somerville 43, Mass.

COLOR STANDARDS FOR CABLES AND WIRES

Continued from page 24

A typical color specification for a neutral color is as follows:

Centroid N 5/	
Limits of chromaticity.....	5R 5/1
	5Y 5/1
V+ N 6/	5G 5/1
V– N 4/	5B 5/1
	5P 5/1

The procedure for testing value limits in this case is the same as for the chromatic color. To test for compliance with the chromaticity limits, the sample is again compared to the centroid. It will usually deviate from the centroid toward one of the chromaticity limits, or in an angular direction intermediate to two adjacent limits.

If it is visually between the centroid and these limits, it meets the specification. If it is more saturated, and therefore more chromatic than these limits, it fails to meet the specification.

Fig. 3 shows the above eight colors (N 5/ is duplicated) in their proper order. Note that the permissible colors are surrounded by a line. Outside this line are five additional chromatic colors on the right and two additional neutral colors on the left. These samples indicate colors which are beyond the permissible limits and which therefore have too large a deviation from the centroid to be acceptable.

Such colors are included to permit the inspector more readily to determine the position of his sample with reference to the centroid and the permissible limits. Colors that fall between the permissible limits and these unacceptable colors are, of course, unacceptable.

Color standards conforming to the Munsell System of Color Notation are produced and distributed by the Munsell Color Co., Inc.* The principal form in which the Munsell colors are found is the "Munsell Book of Color," which has been used in scientific and industrial color work for many years. Thousands of these books are currently in use and may be used for complying with the new REA color standard.

However, for the REA standards, the Munsell Color Co. has designed a special series of color charts similar to Figs. 2 and 3. These charts will display the appropriate colors in high gloss finish and will contain complete instructions for the use of the charts in complying with REA specifications. Also included will be information on illuminating and viewing conditions, scientific daylight light sources and color vision testing.

These charts will be available from the effective date of the REA specification.

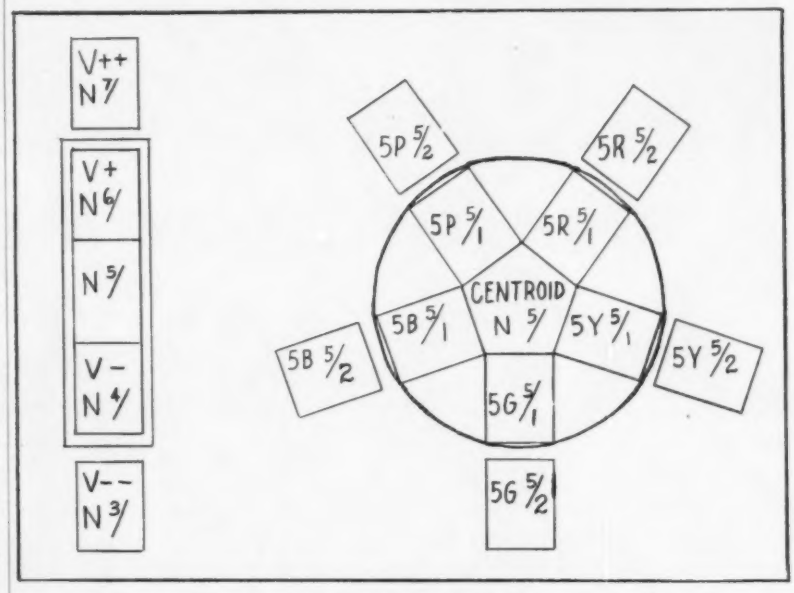

Fig. 3. Munsell color notations. Polyethylene neutral colors.

Acknowledgments

Representatives of several manufacturers of wires and cables, plastics and colorant materials have cooperated with the authors and have played an important part in the development of these color standards.

In particular, the authors wish to

*2441 N. Calvert Street, Baltimore 18, Md.

thank W. J. Kiernan, Bell Telephone Laboratories, W. N. Hale, Munsell Color Co., Inc. and F. F. Farnsworth, former consultant to REA, for significant contributions in the development of these color standards and for their many helpful suggestions during the preparation of this paper.

References

1. Even-Count Cables, F. W. Horn, *Bell Telephone Laboratories Record*, June 1959.

2. Colored Plastics for Wire and Cable, J. B. Howard and V. T. Wallder, *Bell Telephone Laboratories Record*, August 1959.

3. Design of Polyethylene-Insulated Multipair Telephone Cable-Transactions, A. S. Windeler, *AIEE*, June 1959.

4. Transmission Properties of Polyethylene-Insulated Telephone Cables at Voice and Carrier Frequencies, G. S. Eager, L. Jachimowicz, I. Kolodny and D. F. Robinson, *AIEE*, June 1959.

5. Color and Its Description, Dorothy Nickerson, *The American Ceramic Society*, Vol. 27, No. 2, February 1948.

6. Specifying Color By the Munsell System, *ASTM Designation D 1535-58T*, Issued 1958.

Safety Council Issues Winter-Wise Driving Tips

"A driver's strongest defense against winter's deadly, nasty tricks is know-how," reminds the National Safety Council, the publishers of a timely pamphlet designed to provide that know-how.

Entitled, "How to Winter-Wise Your Driving," the 16-page publication covers aspects of winter driving ranging from how to avoid skids on icy roads, to the things to do to ready your car for subzero temperatures.

"This pamphlet," according to the Council, "contains practical, dependable information obtained from tests of vehicles, tires and driving methods by the Council's committee on winter driving hazards."

A single copy of the pamphlet, presented in "colorful, interesting fashion so it will be read, understood and remembered," may be obtained free from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Plan Expansion in Brazil

The Energy & Communications Department of the Brazilian state, Rio Grande do Sul, has approved a plan to install telephone equipment for 14 municipalities. It is seeking a federal allotment of 1.9 million dollars to finance the project.

Opinion's Demands

"The feeble tremble before opinion, the foolish defy it, the wise judge it, the skillful direct it."—MME. ROLAND.

In addition to their regular stock and custom transformers for the electronic industry, ADC has long been a dependable source of transformers and filters to the telephone and telegraph industry. When Western Electric announced they would no longer supply these components to manufacturers, ADC put their 24 years of experience to use designing and tooling a series of "coils" which are electrically and physically interchangeable with similar components made by The Western Electric Company. Many of these are in stock. If you use such components, we suggest that you write for more information. We believe you'll be pleased with both the price and delivery.

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Photo-Optical Memory System Developed by Bell

Photographic plates used in the permanent memory of an experimental electronic telephone switching system are now being exposed and developed automatically, according to Bell Telephone Laboratories.

The permanent memory stores such things as directory information and instructions for the electronic switching system. This information is in the form of thousands of tiny clear dots on an otherwise opaque photographic area 2 inches square.

Seventeen areas are used together to make up a complete photographic plate, and the entire permanent memory store is comprised of four such plates.

The spots of clear and opaque film are scanned by a beam which is generated by a cathode ray tube and focused by a system of lenses. This operation gives rise to the name of the unit —"Flying Spot Store." The movement of the beam is controlled by an electronic and optical positioning system, which must be accurate enough to pick out on each area a particular spot location.

Bell Laboratories states the flying spot store contains over 2 million bits of information as opaque or transparent spots, and can read out a 68-bit word (i.e., 68 spots simultaneously) every 2½ microseconds. Random access to any word adds a major feature of versatility.

R. K. Eisenhart (left) and D. C. Koehler, both of Bell Telephone Laboratories, with bench model of automatic processor for photo memory plates used in an experimental electronic telephone switching system. The plate is suspended from a traveling arm, and is automatically dipped into the various tanks in a predetermined cycle. A periodic burst of air stirs the solutions to ensure uniform development. The case has been removed from the processor for testing purposes.

The store itself is used to expose the plates. The moving beam from the cathode ray tube is focused through an objective lens onto the photosensitive area. The spot is moved over the entire 2-inch-square image area and stopped briefly at positions where a spot exposure is desired. A photographic emulsion was selected which is "slow" enough not to be exposed by the passing of the beam alone, but requiring the lengthened exposure of the pause to make a record.

R. F. Glore, Bell Telephone Laboratories, inserts a light and dust-tight container with an exposed photo plate into an automatic processing machine. This processor was designed to automatically develop, fix, and dry the photo memory plates used in an experimental electronic switching system.

Each of the 17 small areas on a plate is exposed individually, in sequence, while the others are covered by a system of shutters. Automatic control of this operation allows an entire plate, containing 550,000 spot positions, to be exposed in less than three minutes.

After exposure, the plates are withdrawn from the memory unit in a dust and light-proof container and inserted into the automatic processor for developing and fixing. Two of the plates can be processed simultaneously.

Once the plates are inserted in the processor, they are automatically carried through a number of steps. They are dipped into one tank after another, depending on a predetermined schedule. As many as 15 stops may be involved in a typical reversal processing schedule, and appropriate dwell times are also set to allow proper processing.

ENGINEERS

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After developing, reversal, and fixing operations have been completed, the plates are rinsed and dried in filtered air, and delivered back into their container for reinsertion into the memory unit.

The time required for a complete developing schedule is less than a half hour. Once the machine has been put in operation, it will continue through its sequence without interruption. Bell Labs points out the machine has been made simple to operate since it is expected that personnel unfamiliar with photographic procedures will operate it.

Papers describing the Flying Spot Store and the automatic processor were presented to a meeting of the Society of Photographic Scientists & Engineers in Chicago recently by Bell Laboratories engineers.

M. B. Purvis and G. V. Deverall described the photographic problems associated with the construction of a large computer memory and D. C. Koehler discussed the automatic processor.

R. K. Eisenhart and R. F. Glore, also of Bell Laboratories, are co-developers of the processing machine.

See SBT&T Ala. Rate Case As Political Football

Telephone industry people are not the only ones who believe that once in a while a telephone rate case becomes a "political football." In the Dec. 13 issue of the Birmingham (Ala.) *News*, one of that newspaper's staff writers, Hugh Sparrow, stated that many Alabama citizens feel that the recent Southern Bell Telephone & Telegraph Co. rate matter (TELEPHONY, Dec. 19) is a case in point. Mr. Sparrow wrote:

"There are those who feel that the telephone rate case has become a political football.

"They see more recent indication of it in the past week's Alabama Public Service Commission (APSC) refund order.

"In that case Southern Bell Telephone Co. was directed to refund 25 million dollars of about 35 million dollars collected since 1954 in tentative higher rates under a Circuit Court order.

"The APSC's recent order was signed by a commission of which two members are likely to be candidates for public office next year.

"They are (Commission) President Jack Owen and Ralph Smith, recently appointed to a vacancy on the commission. Owen's term expires next year and he will be a candidate for re-election. Smith has been reported as

(Continued on page 52)

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Cushman 780 Trucksters carry the biggest set of rugged muscles ever built into a light hauling vehicle. They offer the greatest economy . . . small initial investment, minimum maintenance expense, operating cost of less than a penny per mile, and savings on taxes and insurance.

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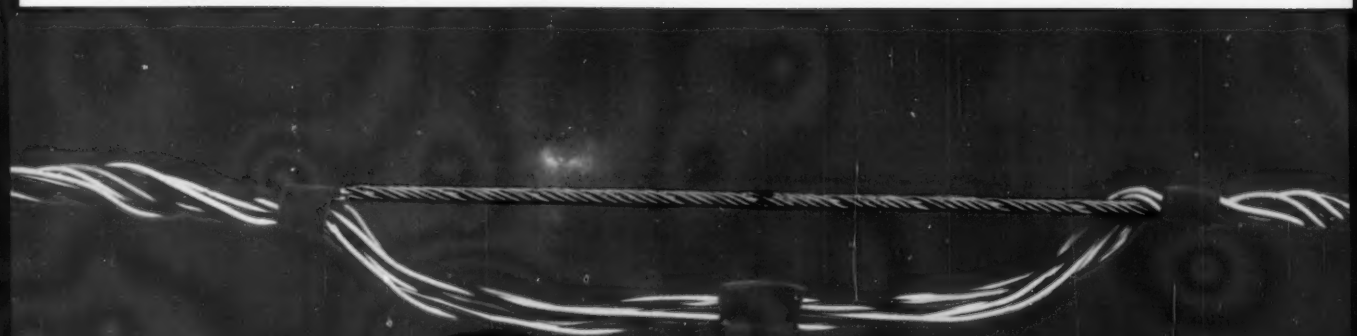

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Special Accessories for Telegraph System Applications

The DC Hybrid Accessory HA-8555 will provide for half-duplex telegraph operation with break-in facilities on an all electronic basis. The Party Line Keying Accessory HB-8691 may be used in party line applications where frequency shift keying is desired. The Leg Adapter Panel HB-8690 provides convenient patching facilities and relay keying for neutral and polar operation over DC lines.

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likely to oppose John Sparkman for U. S. senator.

"Coming virtually on the eve of next spring's primaries, the big refund order, therefore, was something special for any potential candidate.

"It should give them plenty to boast about when campaigning. They could claim responsibility for an order which could mean a sizable refund for about 450,000 telephone company subscribers.

"Another thing that gives the commission order the appearance of a political action is this:

"Reliable reports on Capital Hill say that just a little more than two weeks ago the commission was all set to come out with an order directing the telephone company to refund 17 million dollars.

"Just what caused the commissioners to change their minds and add 8 million dollars more to the refund total is anybody's guess.

"Whether the commission intended it or not, boosting the amount to be refunded to 25 million dollars gave the company a better basis for appealing than would have been the case if the refund had remained at 17 million dollars.

"The company appealed.

"The case therefore was returned to the courts. This could mean that if the telephone company customers ever get anything at all in the way of a refund it will be long after the 1960 elections have been held and all but forgotten.

"Telephone company rates, however, apparently had become a political football even before the commission's 25-million-dollar refund order.

"Several years ago the supreme court, in an earlier rate appeal case, set a yardstick for determining telephone rates.

"The court held that the company was entitled to rates assuring a 6⅔ per cent return on its net investment.

"Rate hearings thus became long and tedious affairs. Values of old and new properties and equipment and other operating costs, including salaries, became matters of sharp controversy.

"Two or three telephone company rate increases had been granted on the basis of the 6⅔ per cent yardstick.

"In each instance the company contended that rapidly skyrocketing postwar costs necessitated frequent upward rate revisions.

"In the spring of 1954 the company filed a new petition for higher rates.

"The hearing was long and hard fought. The commission finally denied the petition.

"The company appealed. Circuit

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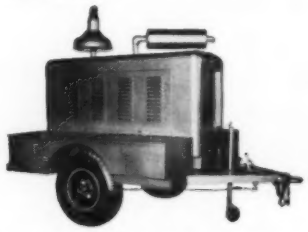

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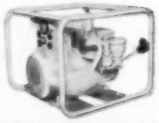

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Judge Walter B. Jones of Montgomery permitted the company to charge the higher rates, under a bond, pending a final decision by the supreme court.

"It took a year or more before the case was argued and finally presented to the supreme court.

"In 1958 Commission President Owen was a candidate for governor.

"When campaigning, he listened to complaints from quite a few who thought they were paying much too high telephone rates.

"Owen insisted the blame should be on the supreme court, which had established the 6⅔ per cent yardstick.

"Apparently the supreme court, which had not ruled on the 1954 telephone rate petition, found the blame distasteful. The court, however, waited till after the 1958 primaries.

"Then the court came out with a ruling which apparently knocked the 6⅔ per cent yardstick for a loop.

"The court remanded the case to the APSC with a court decree indicating a refund was in order and that the APSC was to determine just what should be done about it.

"The supreme court had kicked the political football back to the APSC.

"In establishing a 25-million-dollar refund, the APSC perhaps anticipated that it was giving the telephone company a good reason for an appeal.

"At any rate, the football is now bouncing back in the general direction of the supreme court."

Open First Section of N.B. Microwave System

A 4-million-dollar microwave communications and television system in New Brunswick and Nova Scotia is scheduled for completion early in 1961.

The system, which eventually will cover 1,000 miles with links from Saint John to Halifax and Sydney and from Moncton north to Campbellton on New Brunswick's border, is a joint venture of New Brunswick Telephone Co. and Maritime Telephone & Telegraph Co.

The first section spanning the 100 miles between Saint John and Moncton has been opened.

Special technical arrangements are being made to carry the system 50 miles across the Bay of Fundy from Saint John to the Nova Scotia coast.

Besides licking a signal-transference problem caused by distance, tide changing compensations must be made in antenna arrangements. Microwave signals are reflected off water and the Fundy tides are said to be the largest in the world.

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★ **Power Boom Control** permits fast raising and lowering of boom for rapid trenching; depths are accurately controlled, eliminating guesswork.

★ **Reversible Dirt Conveyor** is standard equipment — deposits dirt at selected distance from either side of trench. In only 60 seconds, conveyor may be switched from one side to the other.

★ **Easy Transporting** — under its own power, the self-propelled Model MA-2 may be run up skids, into a pickup truck, or driven at 2¾ M.P.H. One man loads — transports — unloads — trenches.

★ **Smaller Model JR** Trench-Devil digs 2¾″ or 3½″ wide, up to 20″ deep. Simple, one-man operation and fast — speeds of 15 feet per minute at a 12″ depth.

Write today for full details on both models. Dept. T.

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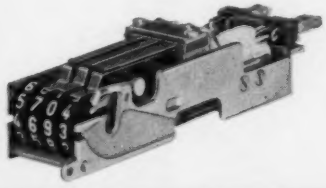

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- priced for maximum economy

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PRESIN CO.
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L. M. Berry & Co. Holds Annual Management Meeting

L. M. Berry & Co. made plans to "Sell-e-brate" 50 years in the directory business in 1960, when 52 of the company's general office, territory, division, and field managers took part in an annual management conference in Dayton, Ohio, from Dec. 7 through Dec. 10.

The four-day meeting was opened by General Sales Manager John W. Berry, who introduced the theme for the coming year, "Sell-e-brate our *Golden Fifty* with Record Sales in 1960."

He explained that the theme was symbolic of L. M. Berry & Co.'s determination to produce record high sales in observance of its golden anniversary. He then reviewed the company's sales activities for the past year, and outlined objectives for 1960.

Mr. Berry then turned the meeting over to W. L. Wolcott, personnel and training director, who pointed out the highlights of the company's personnel operations during 1959.

Mr. Wolcott was followed by general training manager, S. H. Rainey, and General Sales Training Supervisor W. C. Fish, who stressed the need for better basic sales training in the field.

They were assisted in this presentation by J. M. Bayley, eastern sales manager, New York division manager, J. W. Nagel, and Pennsylvania division manager, R. T. Davis, each of whom discussed the good results of intensive basic sales training, obtained in their respective territories.

Sales Promotion Manager R. W. Brundige opened the second day of talks by introducing a new classification filing system which will be issued to all sales personnel in the near future. He explained that the new system for filing classification material in a handy carrying case is expected to result in better organization of salesmen's time, and in greatly improved planning and presentation procedures.

He was followed by J. W. Craig Jr., general sales supervisor, who presented a forecast of "Sales in the Sixties."

He explained that the optimistic general business outlook for the next 10 years presented greater challenges and opportunities for directory advertising than ever before. Mr. Craig's talk was followed by a detailed explanation of management's approach to the 1959 Louisville canvass, presented by W. C. Welch, Kentucky division manager.

General Art Director Phil Engle opened the third day of the conclave with a review of the 1959 Art Directors' Conference, after which he discussed the sales results of "special spec copy," which is produced by the general art department to provide salesmen with finished display spec to show to subscribers.

He was assisted on this topic by Louisiana division manager, R. H. Eshelman, whose division led in the sales of Special Spec for 1959. The meeting was then turned over to gen-

Shown at L. M. Berry & Co.'s annual management conference are: FIRST ROW, left to right: W. J. McGirl, southern sales manager; J. P. White, southern manager; J. W. Craig Jr., general sales supervisor; E. F. Tinnerman, Wisconsin manager; T. A. Calhoun; John W. Berry, general sales manager; Loren M. Berry; W. A. Steuer, general manager; F. L. Hawker, eastern manager; H. F. Scott, mid-western manager; H. C. Hull, statistician; W. L. Wolcott, personnel & training director; J. P. Fraim, executive assistant. SECOND ROW, left to right: R. W. Brundige, sales promotion manager; R. H. Eshelman, Louisiana division manager; L. E. Hurrelbrink, Kentucky division sales manager; J. W. Egnor, sales promotion supervisor; R. E. Shearer, Alabama division sales manager; W. R. Calhoon, auditor; J. C. Grimes, Tennessee division sales manager; R. W. Aleff, Louisiana division sales manager; J. B. Bowen, Alabama division manager; T. M. Kenney, assistant general art director; H. C. Evans, mid-western division manager; B. D. Addington, mid-eastern division manager; R. T. Davis, Pennsylvania division manager; R. A. Maner, Florida division manager. THIRD ROW, left to right: J. E. Whalen, Wisconsin division manager—state; Phil Engle, general art director; J. D. Beckham, southern personnel manager; J. D. Bristow, mid-western division supervisor; N. E. Robinson, Ohio division manager; R. F. Watts, general sales assistant; H. L. Boebel, Mississippi division manager; L. P. Germuska, Ohio division sales manager; H. Pierce, West Tennessee district sales manager; W. R. Green, mid-western sales administrative supervisor; M. F. Feeney, Wisconsin division manager—Milwaukee; C. W. Peasley, East Tennessee district sales manager. FOURTH ROW, left to right: S. H. Rainey, general sales training manager; A. W. Derbins, Louisiana district sales manager—Shreveport; E. W. Beaney, New York division supervisor; W. C. Welch, Kentucky division manager; J. W. Nagel, New York division manager; L. G. Laughlin, mid-eastern southern district sales manager; J. M. Bayley, eastern sales manager; H. Lamarche, mid-eastern northern district sales manager; C. A. Smith, Tennessee division manager; S. E. Phillips, western division manager; W. C. Fish, general sales training supervisor; J. J. Mullin, personnel methods supervisor; J. L. Bowling, Florida division supervisor; J. H. Deacon, Pennsylvania district sales manager.

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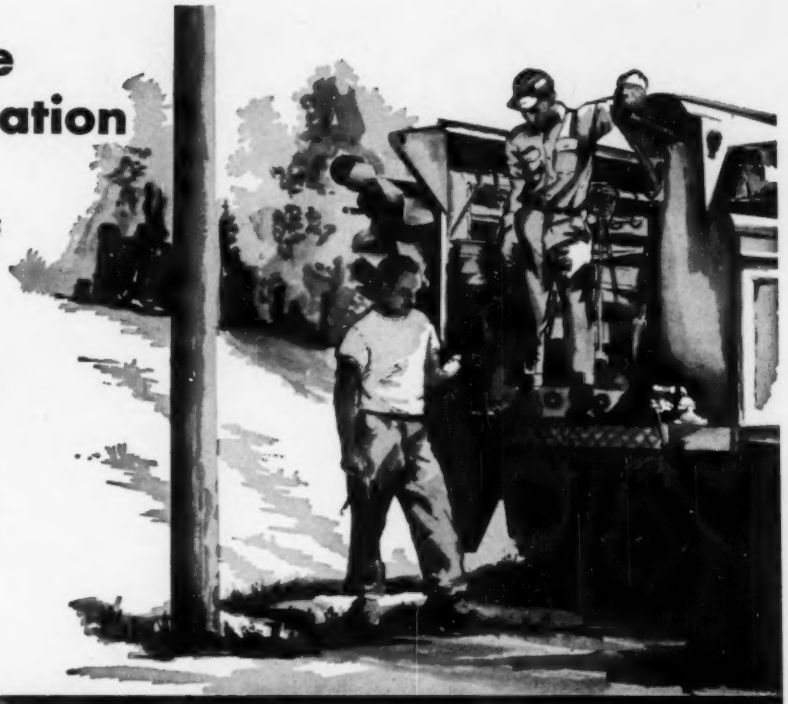

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Northlake, Ill.

eral sales assistant, R. F. Watts, who discussed the results of specialized classification planning, and made recommendations for improvements in classification planning.

He was followed by Sales Promotion Supervisor J. W. Egnor, who discussed sales promotion at the division level, and gave recommendation based on field trip observations.

He was assisted by H. C. Evans, mid-western division manager, who discussed division contests, and B. D. Addington, mid-eastern division manager, who explained his division's recognition program.

Sales Promotion Manager Brundige ended the day's discussions with a presentation of the company's sales promotion plans and projects for the coming year.

The final day of the conference was opened by assistant general art director, T. M. Kenney, who gave a detailed analysis of art time and production. He was followed by personnel methods supervisor, J. J. Mullin, whose topic was "Office Operations and Improvements—Past and Future."

General Sales Manager Berry closed the meeting by discussing "Management of the Future."

In this talk he reviewed the progress of the company and the telephone industry for the past 49 years, then projected company operational figures into the future, stressing that management must look ahead to recognize and adjust to the changes which the future will hold for the directory business.

Recognize the Individual

"The ideal of freedom is not a fanciful myth. It is thoroughly attainable in a practical way. And it will be more readily attainable if we quit regarding those we wish to convert as either masses or classes, and recognize the individual person as the fountainhead of good, of energy, of all that is creative."—HENRY GRADY WEAVER, *Talking to Ourselves.*

Carlisle, England Call Marks Carlisle, Pa. Cut-over

Leading dignitaries of Carlisle, Pa. and Carlisle, England, participated in a transatlantic telephone call on Dec. 12 to mark the introduction of dial telephone service for United Telephone Co. of Pennsylvania's Carlisle exchange.

In arranging the call between the two Carlisles as the first official call through its new dial system, the United company reciprocated for a similar occasion.

In January 1957, Carlisle, England, inaugurated its new telephone system with a call to its namesake and to Dickinson College, located in Carlisle.

Keith Garner, Dickinson College foreign exchange student from Carlisle, England, who participated in the Dec. 12 transoceanic call, is the first recipient of a full scholarship granted by Dickinson College to a student from Carlisle, England. The "good will" scholarship was created and announced as a result of the January 1957 "hands across the sea" telephone call.

Student Garner stole the show during the telephone conversation which was amplified on both sides of the Atlantic for the benefit of audiences who joined in the festivities. The ceremony was also carried by radio and television stations.

Admonished by his father to "stick with your studies and leave the girls alone," young Keith assured his parents that he would study hard and then judiciously avoided the subject of girls and discussed his recently acquired beard, grown for his part in a college play.

Other participants in the transatlantic call, were:

From the United States: Burgess Harry P. Breen; Dr. Frank E. Masland Jr., Dickinson College trustee and emissary in 1958 from Carlisle, Pa., to Carlisle, England; Dr. Gilbert Malcolm, president of Dickinson College, and L. R. Thurston, United Telephone Co. of Pennsylvania, president.

From England: Mayor S. J. Hunter; Sir Robert Chance, lord lieutenant of Cumberland County; L. Charnley, director of education of Cumberland County; J. G. Wilson, postmaster and chief of the telephone system; and Mr. and Mrs. Charles Garner, parents of Keith.

The conversations of those participating in the transatlantic call dealt with the cordial relations that have existed between the two Carlisles, and the wish that these might continue and set the example for the role that small American communities can play in the international affairs of their respective countries.

The similarities between the two Carlisles, and the common concern of their respective citizens for world peace was also emphasized.

Dr. Malcolm, president of Dickinson College, also spoke, and addressed his remarks to Mr. Charnley.

Under the scholarship pact, Dickinson College provides a one-year full-tuition scholarship to a student from Carlisle, England, annually. Service and civic clubs of Carlisle, Pa. share the cost by helping to provide food and

LEFT PHOTO: On the Carlisle, England side of a transatlantic telephone call which marked the cut-over of Carlisle, Pa. to dial service are, left to right: R. J. G. Wilson, head postmaster; L. Charnley, M.A., director of education; Sir Robert Chance, B.A., deputy lieutenant, Cumberland County; W. J. Hunter, mayor of Carlisle; H. D. A. Robertson, town clerk; and Mr. and Mrs. Charles Garner, parents of foreign exchange student Keith Garner. RIGHT PHOTO: Participants on the Carlisle, Pa. side of the call are, left to right: Keith Garner, Dickinson College student; Dr. Gilbert Malcolm, Dickinson College president; Harry P. Breen, burgess; Dr. Frank E. Masland Jr., Dickinson College trustee, and L. R. Thurston, president of the United Telephone Co. of Pennsylvania.

lodging for the "good will ambassador" from overseas Carlisle.

Mr. Thurston spoke to J. G. Wilson, postmaster in Carlisle, England, who is charged with the English city's communications.

"As one telephone man to another," he said, "may I extend to you my very best wishes for continued success in all your endeavors in providing what has come to be one of the important necessities of life, efficient and dependable telephone communication."

The Dec. 12 issue of the Carlisle (Pa.) *Evening Sentinel* featured the cut-over on the first page of the issue and also devoted a special six-page section to the event.

This section gave instructions on how to use the new dial service, explained some of the equipment that was installed and gave a diagram and story telling what goes on when a subscriber dials another telephone. It also explained 2-5 numbering and introduced, with short biographical sketches, some of the company's personnel.

Business firms in the area took advantage of the special pages to insert ads giving their new telephone numbers.

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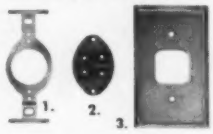
Modern Outlet Hardware Now Available from SUTTLE

SE-63A Junction Box, 45c | SE-60 Mounting Ring* | SE-493A Oval Jack $1.30 | SE-16B Face Plate*

*SE-60 and SE-16B, 45c

Modern Plug and Jack Assembly

Latest telephone practice calls for use of the SE-63A (open) junction box, SE-60 mounting ring with oval SE-493A jack, and one of several types of the SE-16 series face plates. The SE-63A junction box screws into vertical wall studs (2"x4" or other) and accepts the hardware assembly as above.



1. SE-43A Bracket 30c ea.
2. SE-493A Oval Jack $1.30 ea.
3. SE-19B Plate 28c ea.

Modern flush outlet installation utilizing SE-19B standard face plate, SE-493A oval jack, and SE-43A bracket holed for standard conduit box.

Face Plates

45c each, including SE-60 mounting ring and screws.

SE-19B

SE-16A | SE-16B | SE-16C | SE-16D

Five styles of face plates are available. SE-16A takes SE-47C multi-service, 12-terminal connecting block; SE-16B takes SE-493A jack; SE-16C for permanent phone; SE-16D for undecided service; SE-19B accepts SE-493A with SE43A bracket, or, SE-404B jack with SE-44 bracket for flush mounting.

Write Suttle or your local distributor for installation instructions and prices on the above piece parts. In brown, ivory, or blue-beige.

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T. O. P. TOPICS

Continued from page 25

PBX operators. The methods employed will vary in individual cases, but the attitude and efficiency of the PBX operator can be controlled to a great extent by the service advisor through the use of tact and diplomacy.

Preparation for Visits. Regular visits should be planned in advance and made periodically to all PBX boards. The frequency of these visits depends to a great extent upon the size, since the larger attended boards usually require more attention than the smaller ones. A record file should be set up for each board, showing the size and type of the board, name of subscriber, name of attendant and immediate supervisor, date of visits, etc.

Approach. The effectiveness of a visit is determined by the manner and approach of the service advisor. She should introduce herself, if necessary, to the person in charge, explain the purpose of her visit, and ask permission to see and talk to the PBX attendant. In explaining the purpose of the visit, she should show an intelligent interest in the telephone service, and attempt to create confidence in her ability to help in eliminating any unsatisfactory service conditions. The support of the management results in the cooperation of the PBX attendant.

Frequently, the PBX management does not realize the potential business lost due to indifferent or inefficient treatment of their patrons by attendants and extension users. Therefore, it may be necessary at times to tactfully point out the many advantages in maintaining a courteous, speedy and accurate type of telephone service for their business.

Any discussion with the PBX attendant or extension users must be done in a friendly, helpful way, and no suggestion of criticism should enter into the discussion. The service advisor will find that if she gains their confidence, her advice is usually followed and future visits are welcomed.

PBX Attendant. Ordinarily, the service advisor can best determine the effective length of a visit. Usually, 15 or 20 minutes is ample unless some special study or training has been requested. She will have a fairly good idea of the principal features she wishes to discuss, and any additional information will be obtained by watching and listening with the attendant, and observing various conditions which may effect the service. These conditions would include the location of the board, other duties performed by the attendant and the condition and adequacy of the equipment.

In making suggestions for improvement, it is best to concentrate on two or three major items, and be sure any suggestion made will meet with the approval of the PBX management.

Written notes pertaining to the attendant should be made after leaving the customer's premises to avoid giving any impression of "checking up" on any individual.

Particular attention should be called to the importance of the following service features:

(1) Speed of answers.
(2) Tone and identifying phrase of answers.
(3) Progress reports on busy extensions.
(4) Irregularities and discourtesies.
(5) Transferring of inward calls.
(6) Disconnects.

PBX operating booklets serve as a foundation for instructions and may be given to PBX operators or attendants with advantageous results.

Extension Users. The habits of extension users play an important part in the over-all service at a PBX board. The service advisor can do much to help the customer get the greatest good from his telephone if there is opportunity to talk to the extension users. It should be pointed out that faster toll service results if the party places his own call and stays on the line. Also, the desirability of prompt answers and identifying phrases is a courteous service that management usually desires.

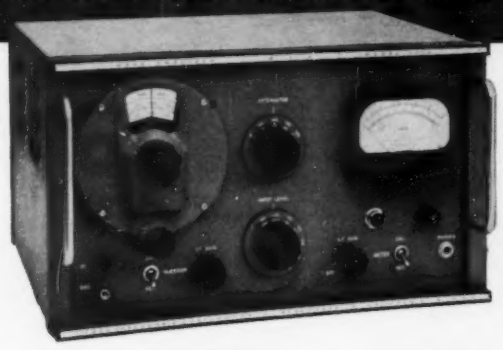
Departure. Before leaving, the service advisor should inform the attendant and the management that she will be glad to be of assistance when desired or necessary, but she should not encourage trivial or unnecessary requests for special visits. She should explain that she will call, periodically, to offer any help or assistance, and to just have a friendly visit.

Records of PBX Installations and Visits. The chief operator should work in cooperation with the plant and commercial departments in obtaining and keeping a list of PBX orders and installations. As soon as the definite date of installation is learned, a file should be prepared for that particular PBX customer and information as to how that type of equipment operates should be entered on the file. The chief operator should work with the plant representative and determine particular operating procedures which apply to that equipment before attempting to explain the operation to the customer.

It may not be necessary that the service advisor visit smaller installations of

Fast, convenient, dependable precision wave analyzers

for wave analysis, wire carrier and microwave subcarrier measurements



Sierra 121A Wave Analyzer is a double superheterodyne receiver covering 15 KC to 500 KC. It provides data directly in volts and dbm at 600 ohms, and offers high selectivity required for single sideband carrier measurements.

Sierra 158A Wave Analyzer is similar to Model 121A but covers 500 KC to 10 MC.

Both instruments have ±2 db accuracy, spurious response at least 50 db down, and signal measurement range of 77.5 μv to 97.5 volts. Available for either cabinet or relay rack mounting.

Frequency-selective carrier-frequency voltmeters

For carrier frequency and other field or laboratory work between 3 KC and 800 KC, Sierra offers five accurate, stable tuned vacuum tube voltmeters. All are direct reading in voltage and dbm at 600 ohms from —80 dbm to +42 dbm. All feature built-in calibration oscillators, level calibration circuits, aural monitoring jacks, and (except 103B) precision spiral scale dials. All are ruggedly constructed of quality components for long operating dependability.

SPECIFICATIONS — SIERRA VOLTMETERS

Model	Frequency Range—kc	Selectivity		Accuracy		Direct Reading in dbm	
		Down 3db	Down 45db	Frequency	Measuring	Balanced	Unbalanced
101C	20-500	± 550 cps	± 2900 cps	Note A	± 3 db	Note D	600 ohms
103B†	3- 40	± 400 cps	± 3000 cps	± 0.5 kc	± 3 db	Note D	600 ohms
104A	5-150	± 300 cps	± 1500 cps	± 1 kc	± 3 db	Note D	600 ohms
108B	15-500	± 550 cps	± 2900 cps	± 3 kc Note B	± 2 db Note C	135 ohms Note D	600 ohms
114A	100-800	± 550 cps	± 2900 cps	Note A	± 3 db	Note D	600 ohms

† Contains carrier re-insertion oscillator for monitoring suppressed carrier systems. Furnished with planetary drive dial. Note A. Ranges from ± 2 KC at low end of dial to ± 3 KC at upper end. Note B. ± 1 KC in the 48 KC to 256 KC region. Note C. ± 1 db for + 30 db to —40 db attenuator steps on 135 ohm balanced measurements. Note D. All models may be converted for 135 and 600 ohm balanced line measurements by convenient plug-in bridging transformer, Model 130D.

Data subject to change without notice.

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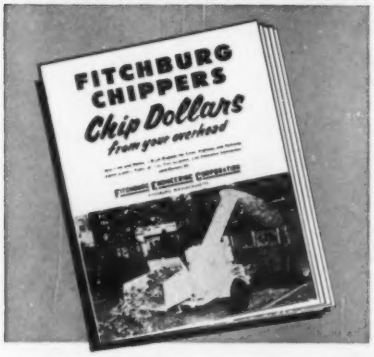

Read how foresters, tree surgeons, highway and park commissions, telephone, power and gas companies cut brush disposal costs up to 50% with a Fitchburg Chipper.

See cut-away color drawings of the Fitchburg Chipper—the exclusive Fitchburg spring-activated feed plate—pictures of different models in action.

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PBX equipment if, in the judgment of the management, the plant representative can instruct the customer satisfactorily.

When possible, she should work with the plant representative when the installation is finished and try out the various operating steps with him, such as: Answering and extending incoming calls, answering and extending extension users' calls, transferring calls and holding calls, when necessary.

Any peculiarities of operating procedure for that particular type of equipment should be carefully noted in order that instructions to the PBX attendant may be as complete as possible at the initial training period. Any trouble or discrepancy in the actual operation and the supposed operation of the equipment should be taken up with the division or district office.

If any person, other than the chief operator, acts in the capacity of service advisor, she should be thoroughly instructed as to the duties and procedures outlined in these instructions.

This is merely a suggested procedure. We would welcome news on how *you* meet this responsibility.

We must all work together to help our VIP's—the PBX customers.

(To Be Continued)

BDSA ESTIMATES GAIN

Continued from page 26

possibly as much as 2½ per cent in 1960.

Construction expenditures of the industry in 1959 will approximate 2.5 billion dollars and should be 2.9 billion dollars in 1960. These expenditures, for buildings, exchange equipment, pole lines, and cable-wire plant construction, make the domestic operating telephone industry the largest single business contractor in the U.S. An increase of more than 4 million telephones placed in service is expected in 1960. In 1960, the total number of telephones in the U.S. is expected to reach 74,790,000, or a gain of 5.7 per cent. The trend, BDSA predicts, is definitely upward.

Because of the increased facilities available, extension of direct distance dialing, and the general business upturn, operating revenue in 1960 should approximate 9 billion dollars, an increase over the probable 1959 figure of 8.25 billion dollars.

Proper Evaluation

"To cure us of our immoderate love of gain, we should seriously consider how many goods there are that money will not purchase, and these the best; and how many evils there are that money will not remedy, and these the worst."—COLTON.

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Write for full data on Reel Jack No. A-1029 and other Simplex Utility Jacks.

Pole Pulling and Straightening Jacks—Save time, cut work crews necessary to pull, straighten or move poles. No. A-1538 has aluminum housing, 15-tons capacity, weighs 63 lbs.

All-Purpose Jack — No. 310A lifts, pulls, pushes at any angle. Four lift points. 15-tons capacity.

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SIMPLEX JACKS

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2357 Gardner Road, Broadview, Illinois

R. W. Engsberg, Ansonia Consultant, Retires

Ralph W. Engsberg, Lake Mills, Wis., telephone communication equipment consultant with Ansonia Wire & Cable Co., on Dec. 21 announced his retirement.

Mr. Engsberg began his telephone career in 1907 as a night operator in Lake Mills for the Interurban Tele-

R. W. ENGSBERG

phone Co. He was then a high school sophomore. After receiving a B.S. degree in electrical engineering at the University of Wisconsin, Mr. Engsberg joined Automatic Electric Co. and began installing dial switching equipment.

Spending 18 months in the Army during World War I, he served in France as a first lieutenant, air service.

When he returned to civilian life in 1919, he went to work for the engineering department of Automatic Electric Co. Six years later, he joined Western Electric Co.'s engineering department.

Returning to AE in 1925, he served in the sales department rising to the position of assistant sales manager.

In 1945, he became telephone chief engineer for Federal Telephone & Radio Corp. and held this post until 1952 when he joined Kellogg Switchboard & Supply Co.

At the time he retired from Kellogg in 1956, to join Ansonia Wire & Cable Co., he was Kansas City division manager.

He is a member of the Independent Telephone Pioneer Association, the Telephone Pioneers of America and Eta Kappa Nu, honorary electrical fraternity.

Plan Move of AE's Western Headquarters Office

The western district office of Automatic Electric Sales Corp.'s communications products division is scheduled to move its headquarters on Jan. 1 from San Francisco to Burlingame, Cal.

The new office will be located at the Mills Estate Garden Court Office Building in Burlingame, a city located on the bay side of the peninsula south of San Francisco.

According to Keith A. Regel, district manager, the move is being made to provide improved customer service through expanded office facilities which can accommodate recent additions to the sales and engineering staff.

The western district will continue to serve the states of Alaska, Arizona, California, Idaho, Nevada, Oregon, Utah, Washington, Wyoming, and parts of Montana.

Holmes Heads Engineering For Stromberg-Carlson

The appointment of Lynn C. Holmes, formerly director of research for the Stromberg-Carlson Division of General Dynamics Corp., as director of engi-

L. C. HOLMES

neering operations, was announced on Dec. 1 by Dr. Royal Weller, vice president of engineering.

In this position, Mr. Holmes will be

Answers to Questions On Page 28

(1) Yes.

(2) No.

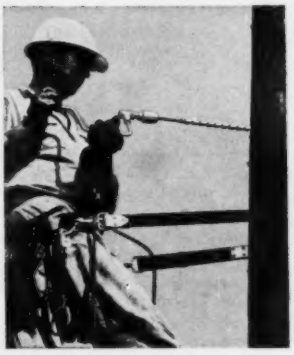
(3) Toll operators in the continental United States and Canada will complete calls directly to telephones or operators in Alaska.

(4) Alaska has four toll centers at the present time.

(5) The Seattle-Anchorage and Seattle-Fairbanks circuits are dial.

New Irwin Pole-Bor Bit

gives non-stop boring



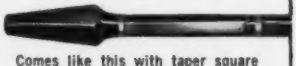
No stopping to clear chips, not even in creosoted poles

Now get easier, faster, non-stop boring action in telephone and power poles with the new Irwin 415T Pole-Bor bit. Chip flow is continuous. Special Irwin cutting head, twist angle, and smooth-polished hollows eliminate clogging and binding — even when boring clean through creosoted poles. Spur on head outlines hole ahead of cutting edge. Side lip then smooths hole, making it easier to insert bolts or pins.

And Irwin's exclusive and patented Adapter Shank chucks perfectly in both hand braces and electric drills to cut inventory costs by 50%, speed work on the job. All Irwin Pole-Bor bits are made of special high analysis steel, heat treated full length and machine sharpened for extra accuracy, longer life. Save time, save money. Order from your Irwin distributor.

Overall Length: Approximately 18", with 12" twist, 6" shank
12 Sizes: 9/16" to 17/16"

Irwin Adapter Shank fits both hand braces and electric drills



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concerned with plans for engineering staffing and for the evaluation of engineering projects in keeping with long range plans for expansion of the division's engineering functions, Dr. Weller said.

Mr. Holmes has been with Stromberg-Carlson since 1943, when he joined the company as senior engineer in charge of sound recording research. In 1950 he became associate director of research, and, later that same year, director of research.

He is currently serving as vice president of the Empire District No. 1 of the American Institute of Electrical Engineers, of which he is a fellow; and he has, at various times, held all the offices of the Rochester Section of the A.I.E.E. He also is a fellow of the Institute of Radio Engineers, a member of the Acoustical Society of America, and a member of Sigma Xi and of the Scientific Research Society of America.

He is the Stromberg-Carlson representative in the American Society for Engineering Education and in the Industrial Research Institute, and in 1955 he served as chairman of the institute's awards committee.

Mr. Holmes was born in Brookfield, N. Y., and received bachelor's and master's degrees in electrical engineering from Rensselaer Polytechnic Institute.

From 1925 until he joined Stromberg-Carlson in 1943, he was a member of the engineering faculty at Rensselaer, first as an instructor, and later as assistant professor of electrical engineering. He holds a New York state professional engineer's license.

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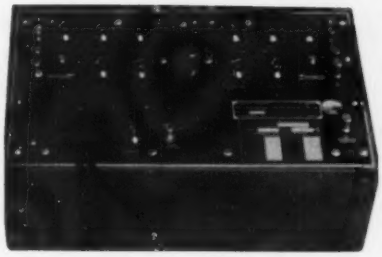

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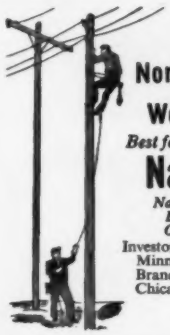

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30	GB706	GB606
42	GB707	GB607
54	GB708	GB608
66	GB709	GB609
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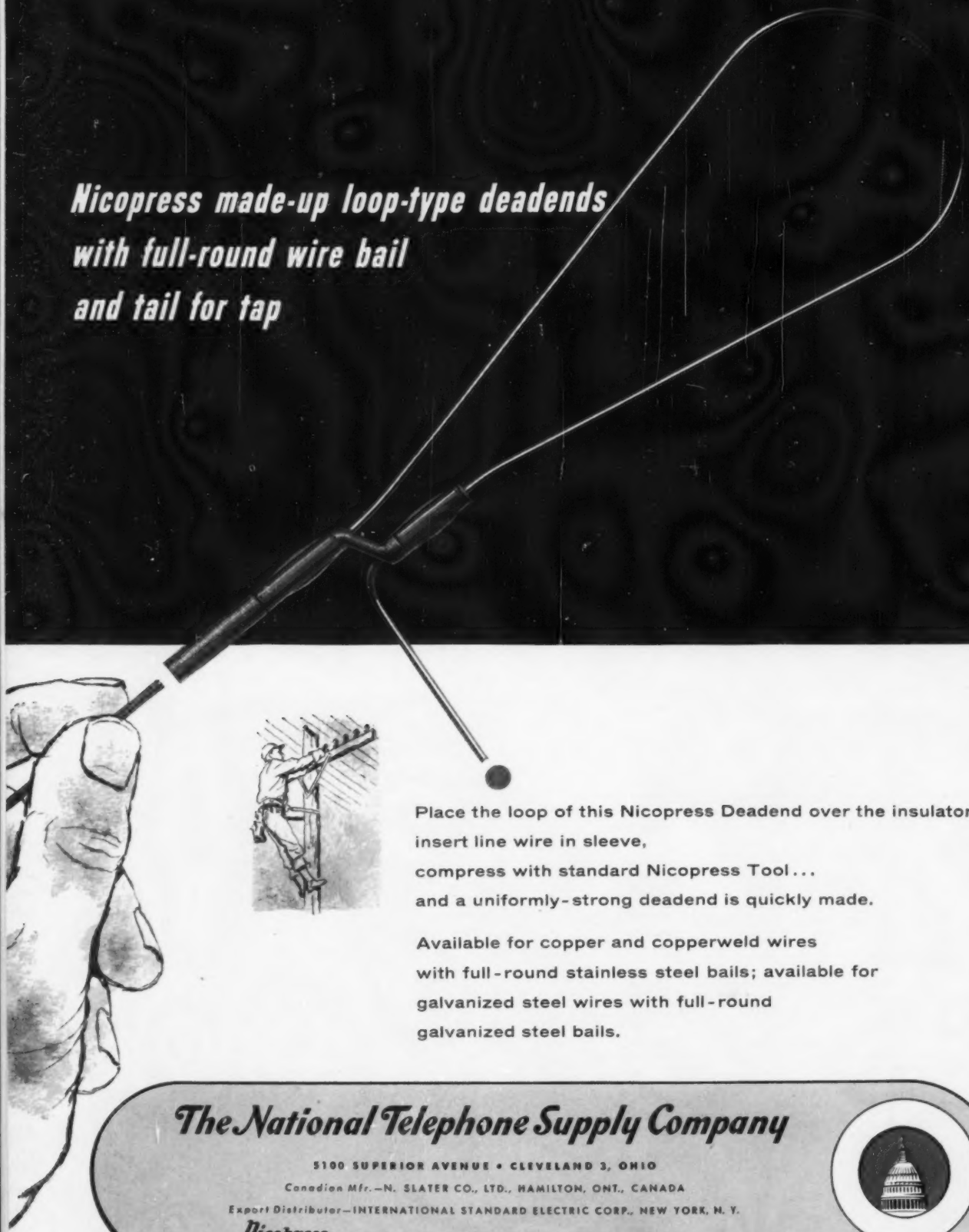
CHARLOTTESVILLE, VIRGINIA

Nicopress made-up loop-type deadends with full-round wire bail and tail for tap



Place the loop of this Nicopress Deadend over the insulator...
insert line wire in sleeve,
compress with standard Nicopress Tool...
and a uniformly-strong deadend is quickly made.

Available for copper and copperweld wires
with full-round stainless steel bails; available for
galvanized steel wires with full-round
galvanized steel bails.

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

Canadian Mfr.—N. SLATER CO., LTD., HAMILTON, ONT., CANADA

Export Distributor—INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

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